FINISHES & INTERIORS SECTOR

Making reuse happen in fit-out

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Troldtekt®
Acoustic Solutions since 1935
By Kingspan

Programme

Introduction
Flavie Lowres, FIS Sustainability Lead

Aligning Specifications to support reuse
Rachel Hoolahan, Associate, Orms

Glazed partitioning reuse – challenges and opportunities
Andrew Stammers, HSQE Manager, Optima

A contractors viewpoint
Sara Lopez, Environmental and Sustainability Manager, BW: Workplace Experts

The importance of urban miners
Katherine Adams**,** Director, Reusefully

Flavie Lowres

Sustainability Champion, FIS

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11% of UK construction spend is on fit-out

Buildings may have 30 fit-outs during their lifecycle

FIS

Representing the finishes & interior sector

Ongoing vetting of contractors

Setting higher standards

Driving quality through a focus on

PRODUCT
PROCESS
PEOPLE

It’s about you…
Finishes and Interiors Sector

www.thefis.org

The reality

- The construction industry represents:
  - Largest user of materials in the UK
  - 60 Mt waste from construction and demolition per year
  - Large contribution to GHG emissions

The challenge

- Much focus on new build
- Offices are refitted every 5-7 years
- Fast turn around

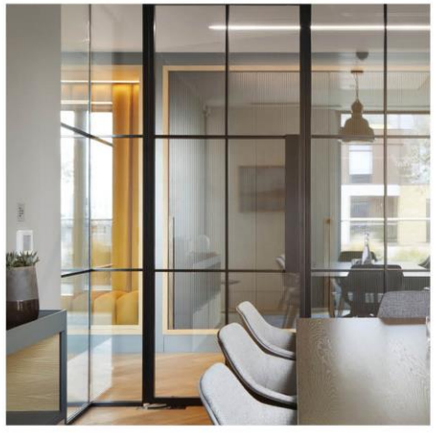
Rachel Hoolahan
Associate, Orms

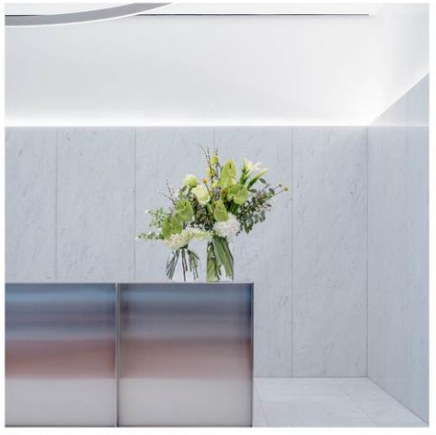
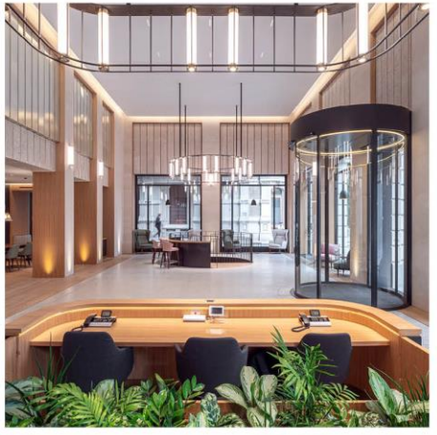
Aligning specifications to support reuse


We are Orms.

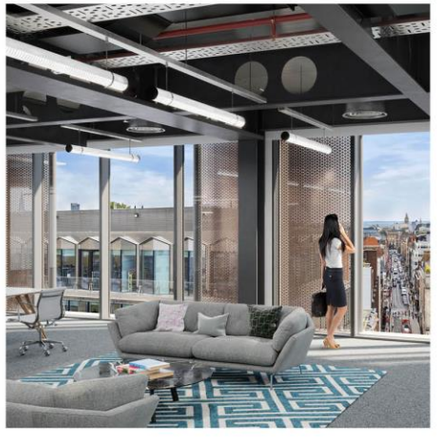


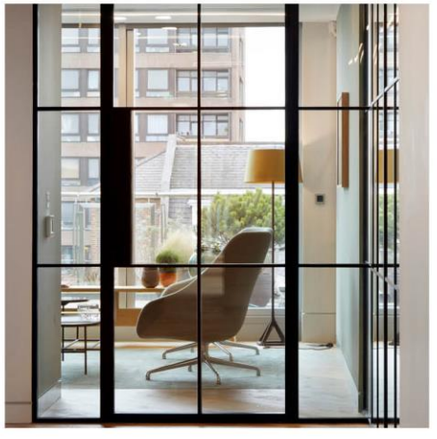








We believe that good design is inherently sustainable and should influence every decision in the design process at every level and scale. Successful sustainability is the sum of all parts.

Material Passports

<<<Orms<<<Mtrlspssprt<<<issue01<<2021<<

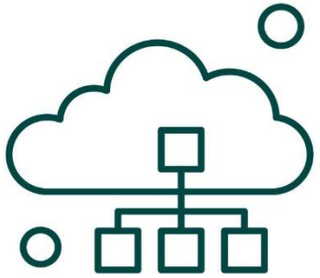
Materials Passports:

Accelerating Material Reuse in Construction

Dr Ana Rute Costa, Rachel Hoolahan

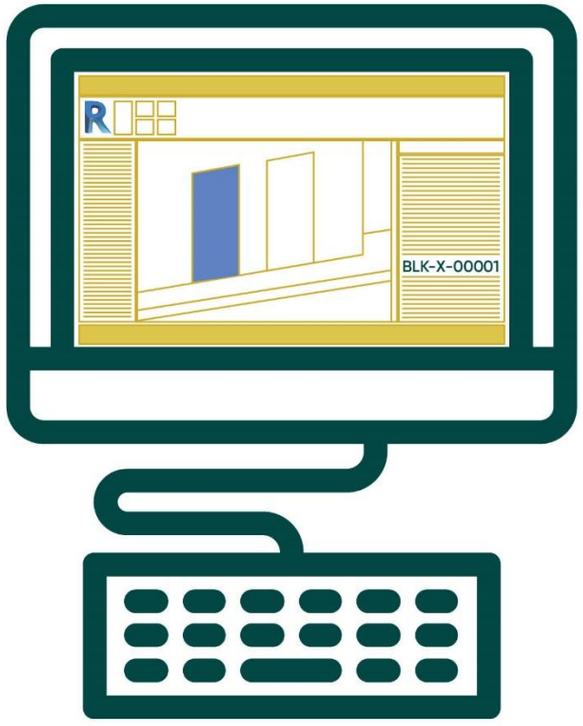
Orms Lancaster University

Passporting in action: design



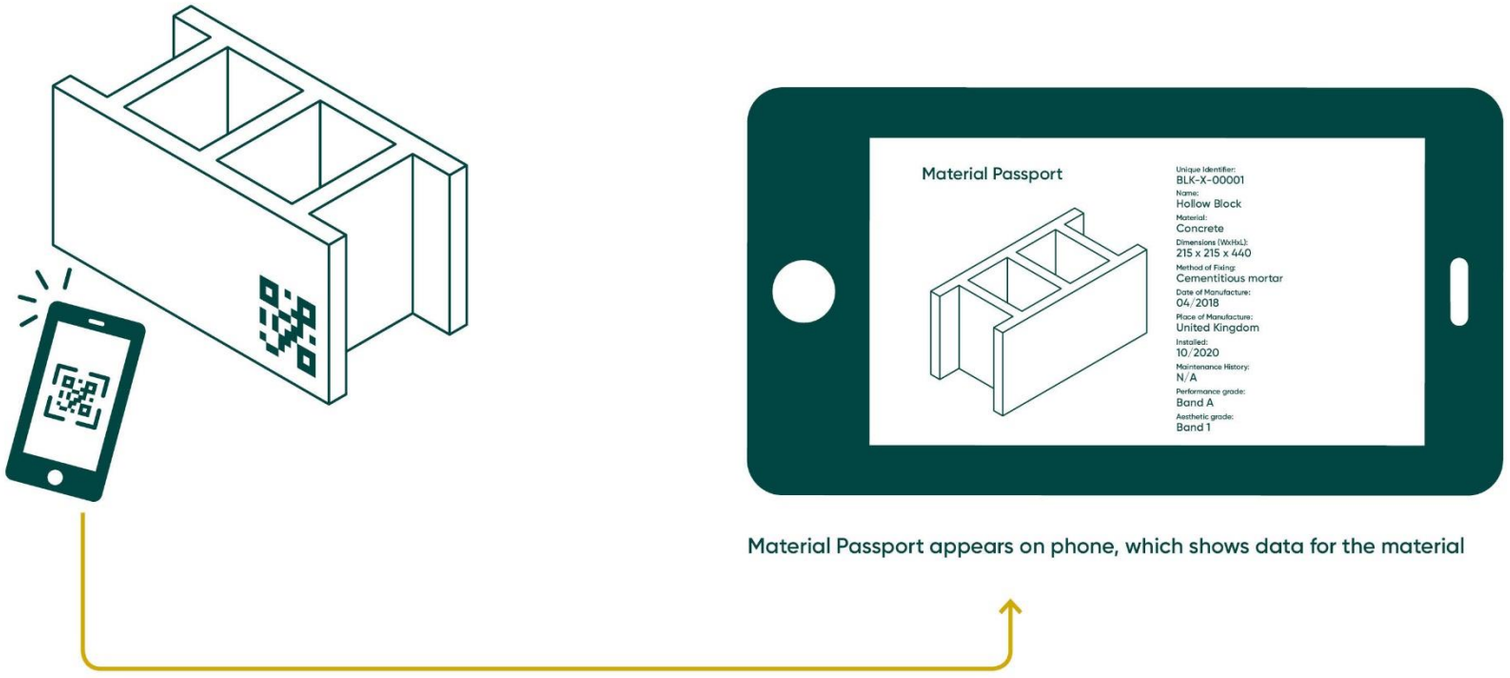
Unique Identifier:	Name:	Material:	Dimensions (WxHxL):	Method of Fixing:	Date of Manufacture:	Place of Manufacture:	Installed:	Maintenance History:	Performance grade:	Aesthetic grade:
BLK-X-00001	Hollow Block	Concrete	215 x 215 x 440	Cementitious mortar	04/2018	United Kingdom	10/2020	N/A	Band A	Band 1
BLK-X-00002	Hollow Block	Concrete	215 x 215 x 440	Cementitious mortar	04/2018	United Kingdom	10/2020	N/A	Band A	Band 1
BLK-X-00003	Hollow Block	Concrete	215 x 215 x 440	Cementitious mortar	04/2018	United Kingdom	10/2020	N/A	Band A	Band 1

Assign Unique Identifier to Revit elements and populate database.



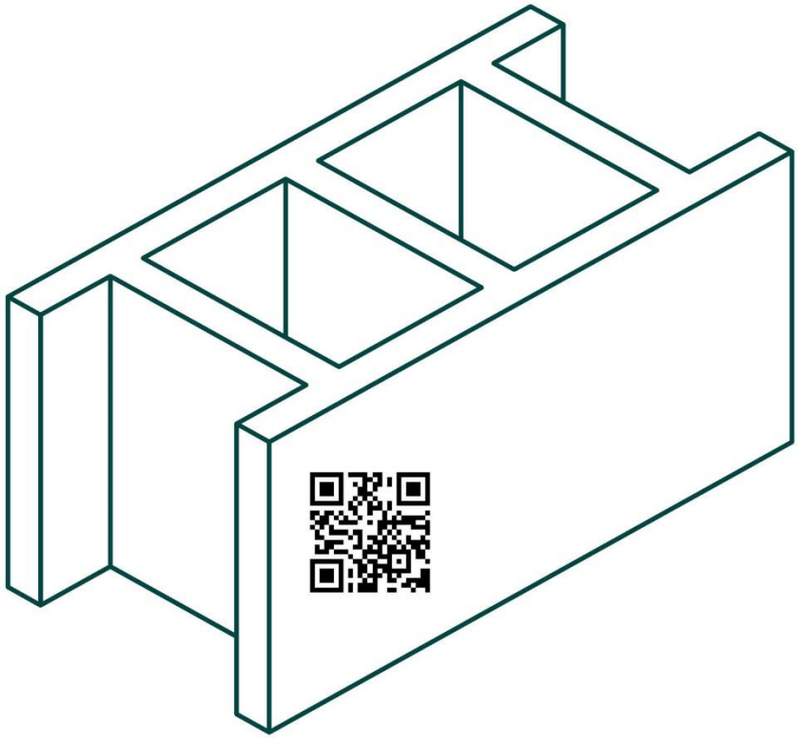
Passport data can be selectively imported into Revit from the database

Passporting in action: in use



Material Passport appears on phone, which shows data for the material

Material Passport



Unique Identifier:
BLK-X-00001

Name:
Hollow Block

Material:
Concrete

Dimensions (WxHxL):
215 x 215 x 440

Method of Fixing:
Cementitious mortar

Date of Manufacture:
04/2018

Place of Manufacture:
United Kingdom

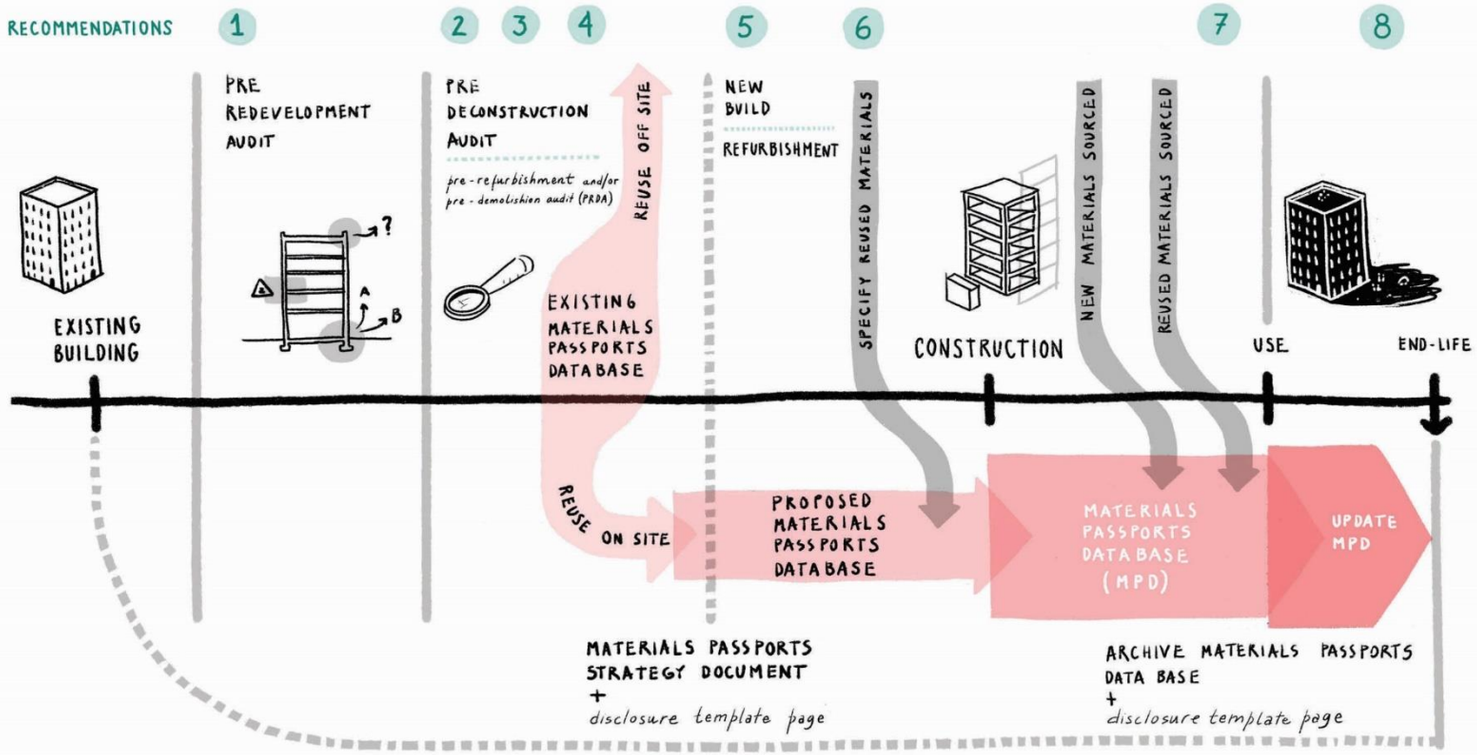
Installed:
10/2020

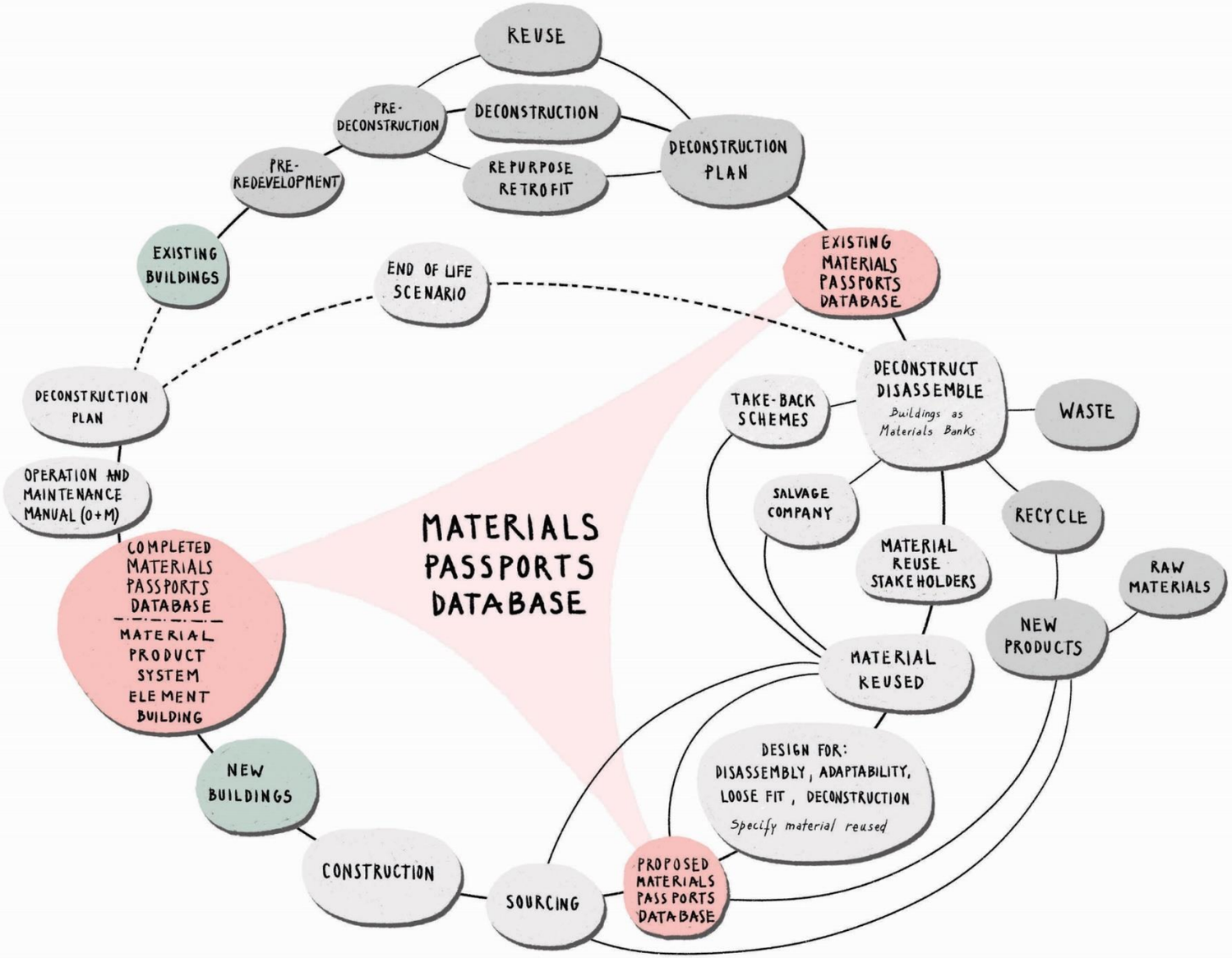
Maintenance History:
N/A

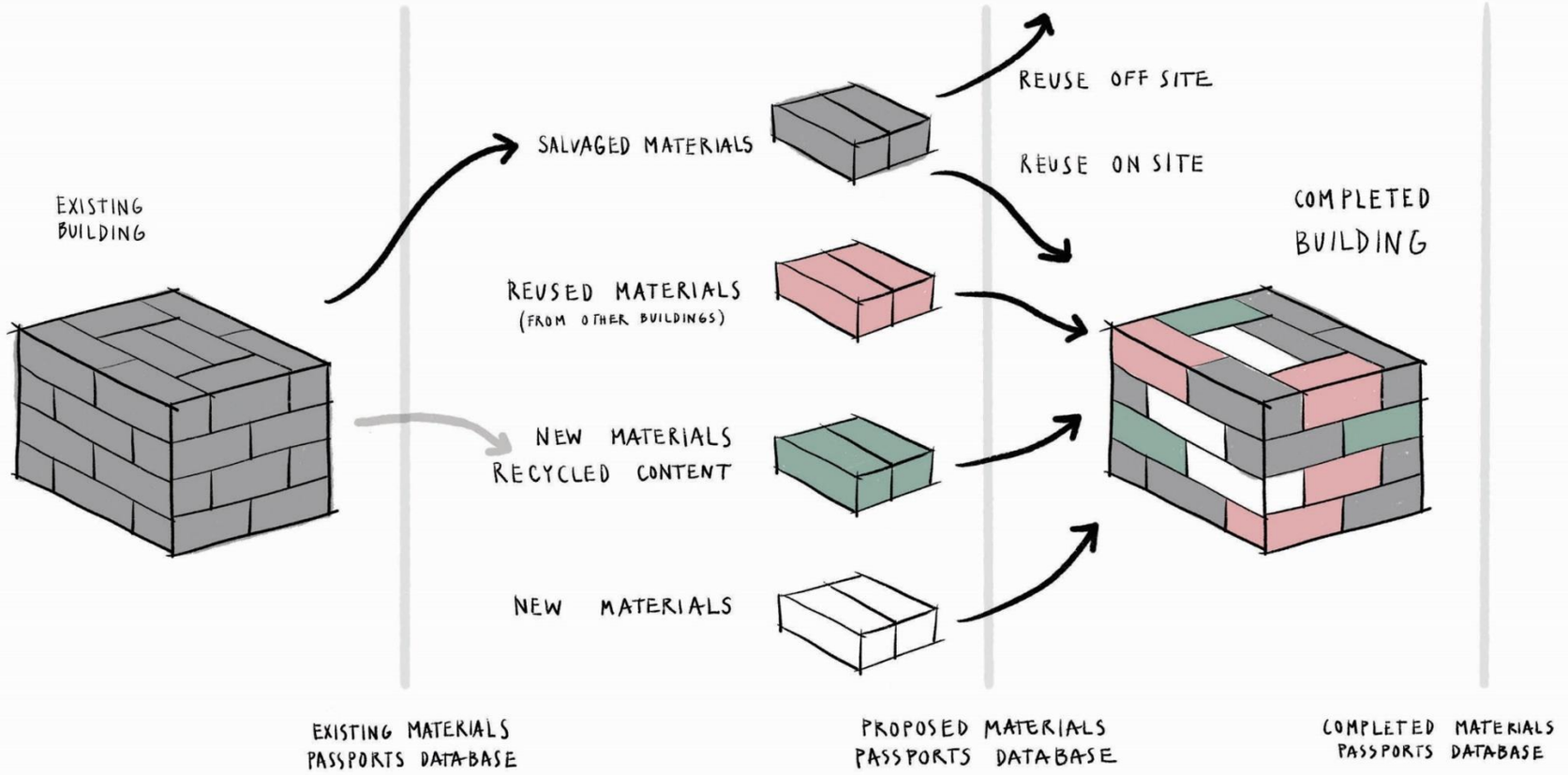
Performance grade:
Band A

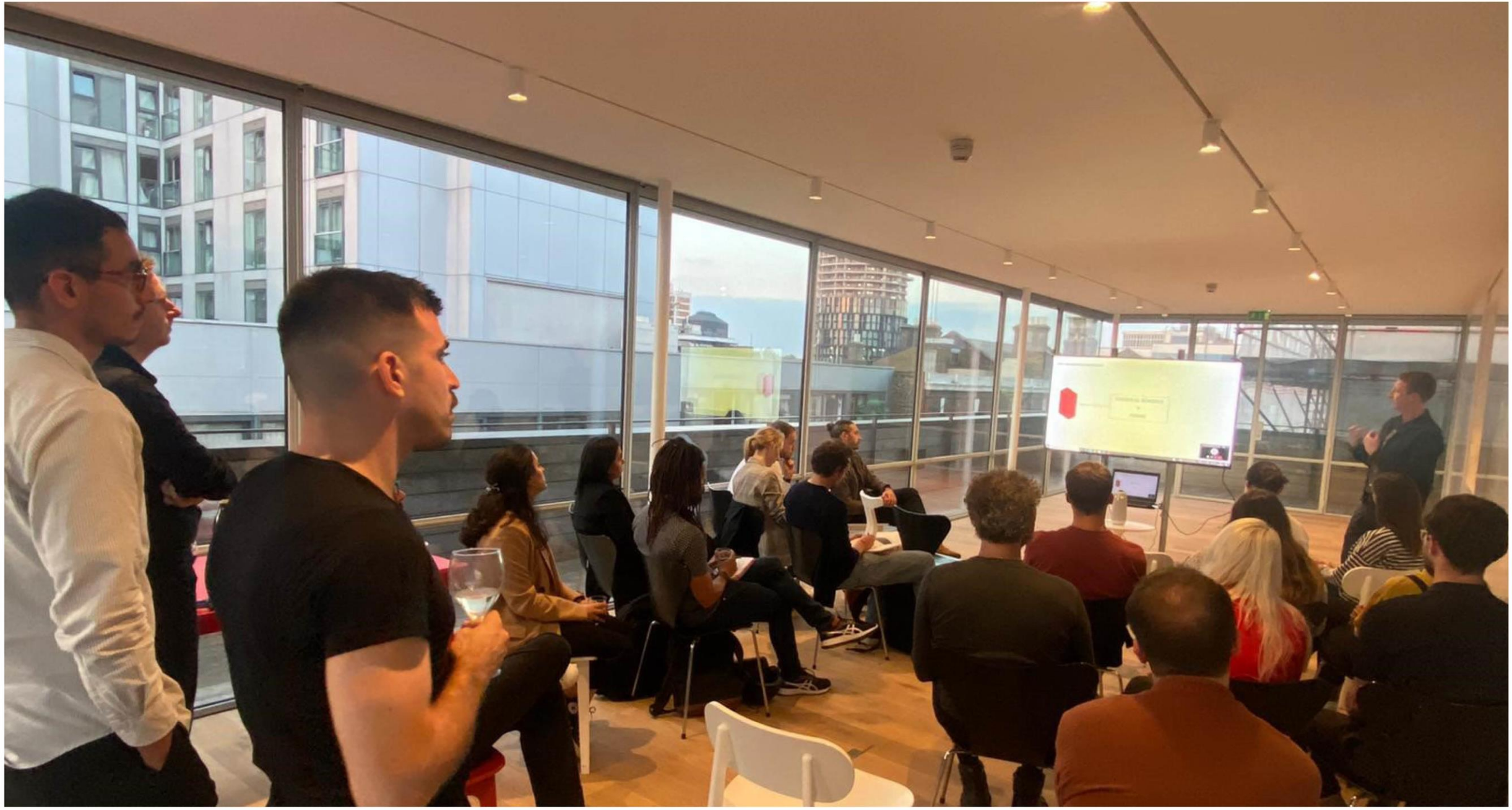
Aesthetic grade:
Band 1

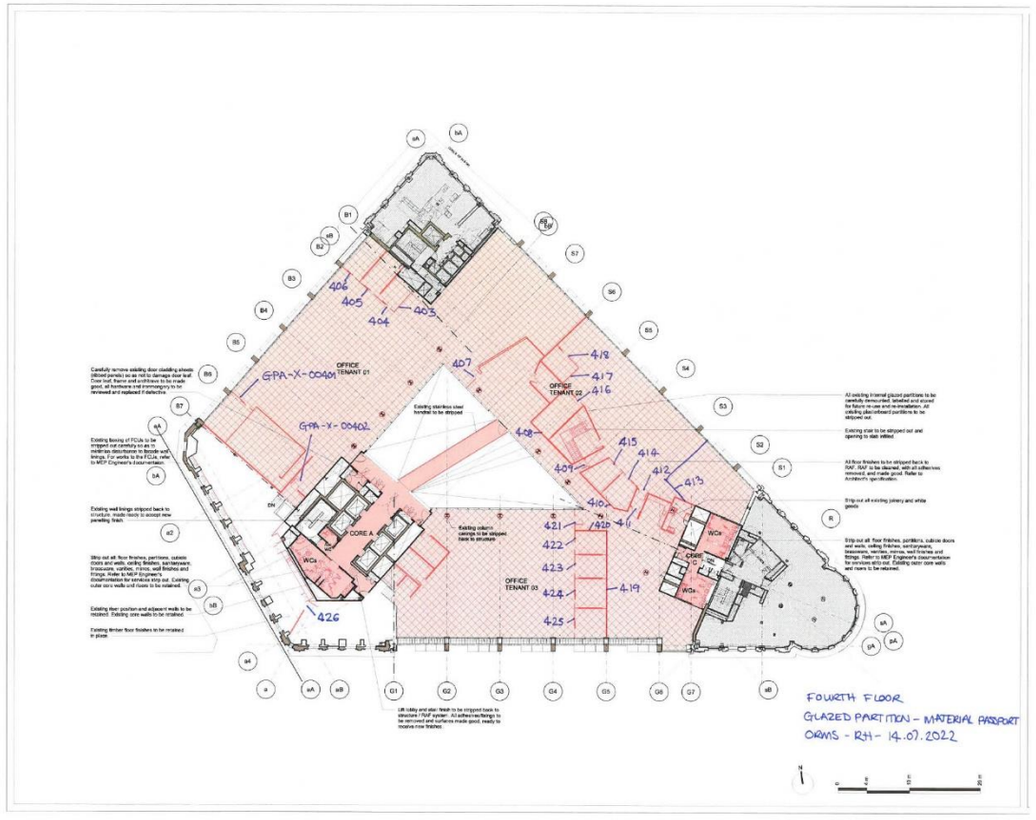
<<N<<Re:Port<<<Orms<<<Mtrlspssprt<<<issue01<<2021<<

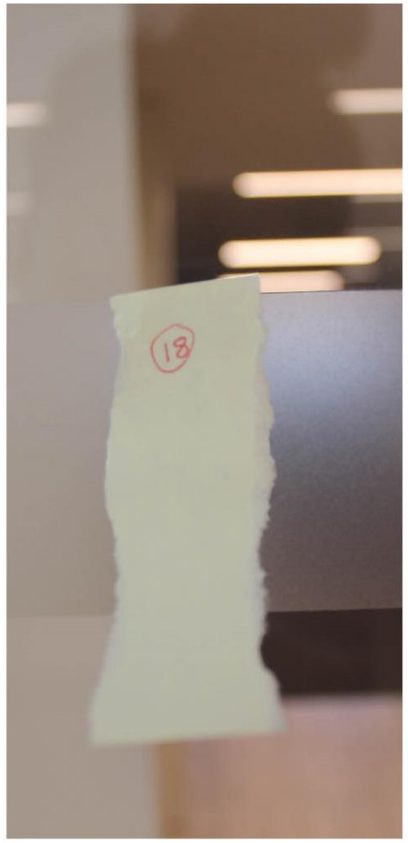

RECOMMENDATIONS
1
2
3
4
5
6
7
8
PRE REDEVELOPMENT AUDIT
PRE DECONSTRUCTION AUDIT
pre-refurbishment and/or pre-demolishion audit (PRDA)
NEW BUILD
REFURBISHMENT
REUSE OFF SITE
SPECIFY REUSED MATERIALS
NEW MATERIALS SOURCED
REUSED MATERIALS SOURCED
EXISTING BUILDING
EXISTING MATERIALS PASSPORTS DATABASE
CONSTRUCTION
USE
END-LIFE
REUSE ON SITE
PROPOSED MATERIALS PASSPORTS DATABASE
MATERIALS PASSPORTS DATABASE (MPD)
UPDATE MPD
MATERIALS PASSPORTS STRATEGY DOCUMENT
+
disclosure template page
ARCHIVE MATERIALS PASSPORTS DATA BASE
+
disclosure template page


REUSE
PRE-DECONSTRUCTION
DECONSTRUCTION
REPURPOSE RETROFIT
DECONSTRUCTION PLAN
PRE-REDEVELOPMENT
EXISTING BUILDINGS
END OF LIFE SCENARIO
EXISTING MATERIALS PASSPORTS DATABASE
DECONSTRUCT DISASSEMBLE
Buildings as Materials Banks
TAKE-BACK SCHEMES
WASTE
SALVAGE COMPANY
RECYCLE
MATERIAL REUSE STAKEHOLDERS
RAW MATERIALS
NEW PRODUCTS
MATERIAL REUSED
DESIGN FOR: DISASSEMBLY, ADAPTABILITY, LOOSE FIT, DECONSTRUCTION
Specify material reused
PROPOSED MATERIALS PASSPORTS DATABASE
SOURCING
CONSTRUCTION
NEW BUILDINGS
COMPLETED MATERIALS PASSPORTS DATABASE
MATERIAL PRODUCT SYSTEM ELEMENT BUILDING
OPERATION AND MAINTENANCE MANUAL (O+M)
DECONSTRUCTION PLAN
MATERIALS PASSPORTS DATABASE


EXISTING
BUILDING
SALVAGED MATERIALS
REUSED MATERIALS
(FROM OTHER BUILDINGS)
NEW MATERIALS
RECYCLED CONTENT
NEW MATERIALS
REUSE OFF SITE
REUSE ON SITE
COMPLETED
BUILDING
EXISTING MATERIALS
PASSPORTS DATABASE
PROPOSED MATERIALS
PASSPORTS DATABASE
COMPLETED MATERIALS
PASSPORTS DATABASE




GPA-X-00401
GPA-X-00402
OFFICE TENANT 01
OFFICE TENANT 02
OFFICE TENANT 03
CORE A
WCs
406
405
404
403
407
418
417
416
415
414
409
412
413
410
421
422
423
424
425
419
426
FOURTH FLOOR
GLAZED PARTITION - MATERIAL PASSPORT
ORMS - RH - 14.07.2022


18

20 Air Street | Data | Automations | Interfaces

Materials Database | + Add or import

Views | Database | Hide fields | Filter | Group | Sort | Color

Find a view

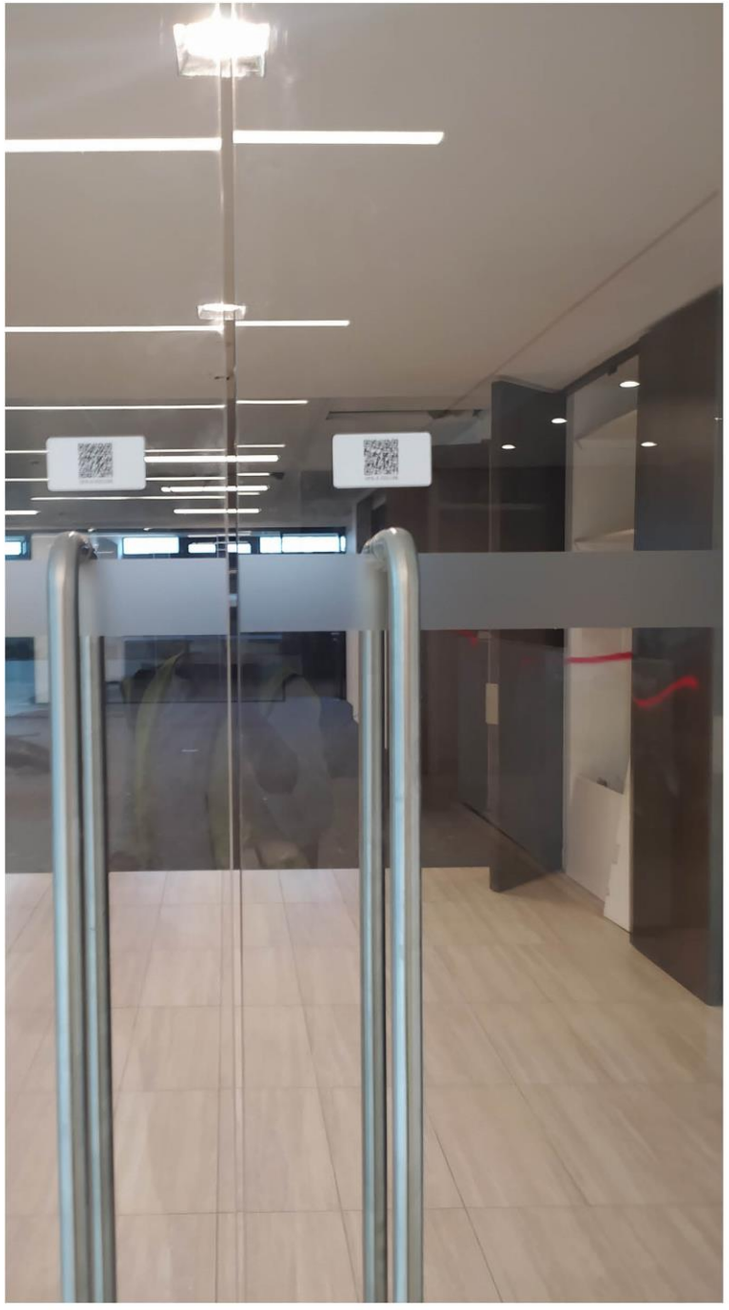
- Database
- Gallery - Design Team
- Material Passport
- Available for Reuse
- Material Release Gallery
- New Component Form
- Barcodes

Create...

- Grid
- Form
- Calendar
- Gallery
- Kanban
- Timeline
- Gantt

	ID - Unique Identifier Parent	ID - QR Code
1	GPA-X-00401A	
2	GPA-X-00401B	
3	GPA-X-00401C	
4	GPA-X-00401D	
5	GPA-X-00402A	
6	GPA-X-00403A	
7	GPA-X-00403B	
8	GPA-X-00403C	
9	GPA-X-00403D	
10	GPA-X-00404A	
11	GPA-X-00404B	
12	GPA-X-00404C	
13	GPA-X-00405A	
14	GPA-X-00405B	
15	GPA-X-00405C	
16	GPA-X-00406A	
17	GPA-X-00406B	
18	GPA-X-00406C	
19	GPA-X-00407A	
20	GPA-X-00407B	
21	GPA-X-00407C	
22	GPA-X-00407D	
23	GPA-X-00408A	
24	GPA-X-00408B	
25	GPA-X-00408C	
26	GPA-X-00408D	
27	GPA-X-00408E	
28	GPA-X-00408F	
29	GPA-X-00408G	
30	GPA-X-00408H	
31	GPA-X-00408I	
32	GPA-X-00408J	
33	GPA-X-00408K	

GPA-X-00501A	GPA-X-00501B	GPA-X-00502A
GPA-X-00502B	GPA-X-00502C	GPA-X-00502D
GPA-X-00502E	GPA-X-00503A	GPA-X-00503B
GPA-X-00503C	GPA-X-00504A	GPA-X-00504B
GPA-X-00504C	GPA-X-00504D	GPA-X-00504E
GPA-X-00505A	GPA-X-00505B	GPA-X-00505C
GPA-X-00505D	GPA-X-00505E	GPA-X- 00506A
GPA-X-00506B	GPA-X-00506C	GPA-X-00506D




Transport Route
Storage Route
TENANT 01
CORE A
TENANT 03
Existing steel handrail to be stripped under Main Works Contract
Existing column casings to be stripped back to structure

GPA-X-00522B

ID - DESCRIPTION
Single Glazed

ID - MANUFACTURER
Glass Solutions

ID - INFORMATION SOURCE
C1 - Specialist survey

LOCATION - EX - SITE
20AS

LOCATION - EX - LEVEL
05

DIM - HEIGHT
2608

DIM - WIDTH
525

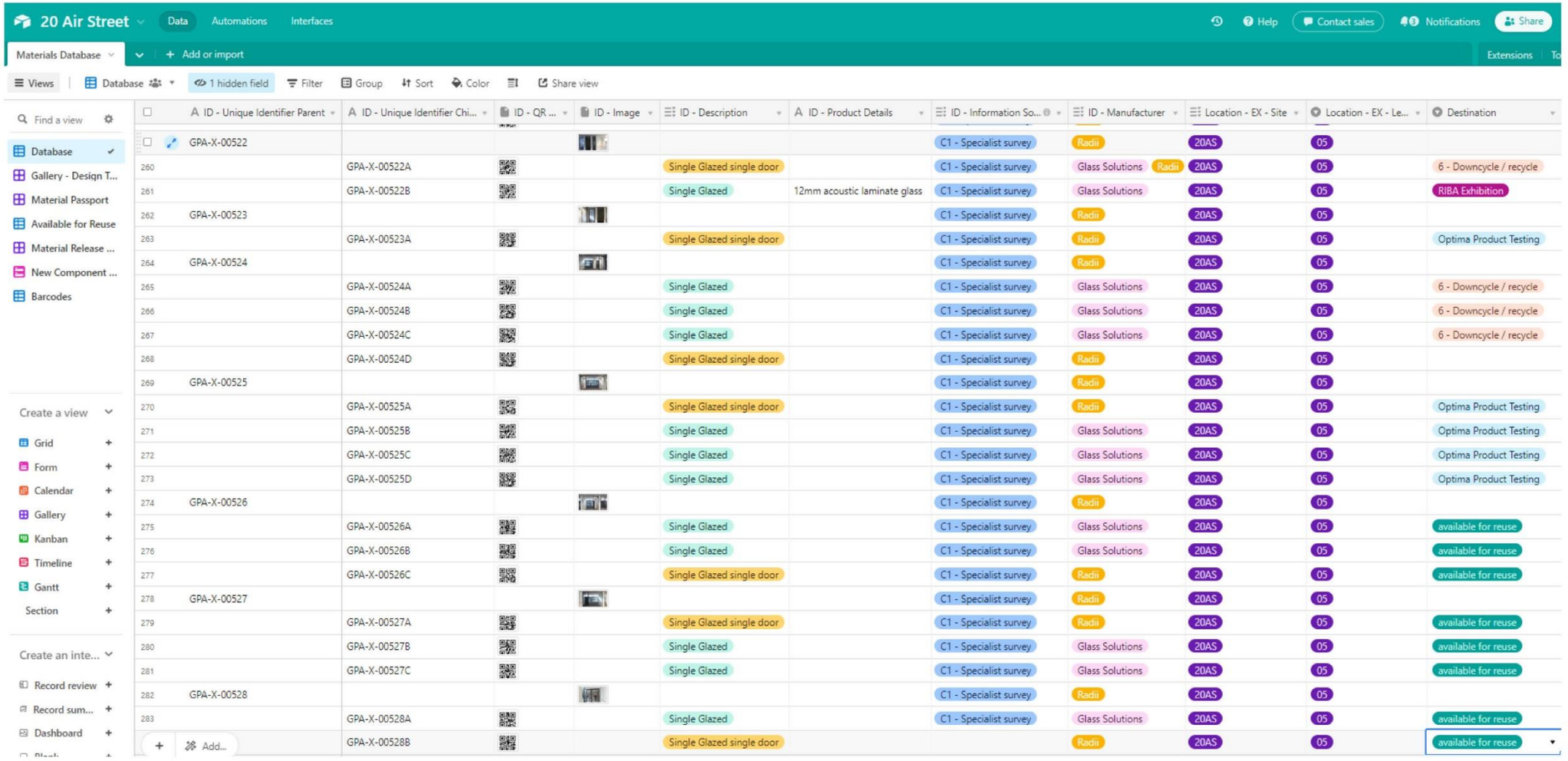
DIM - THICKNESS
12

DESTINATION
RIBA Exhibition

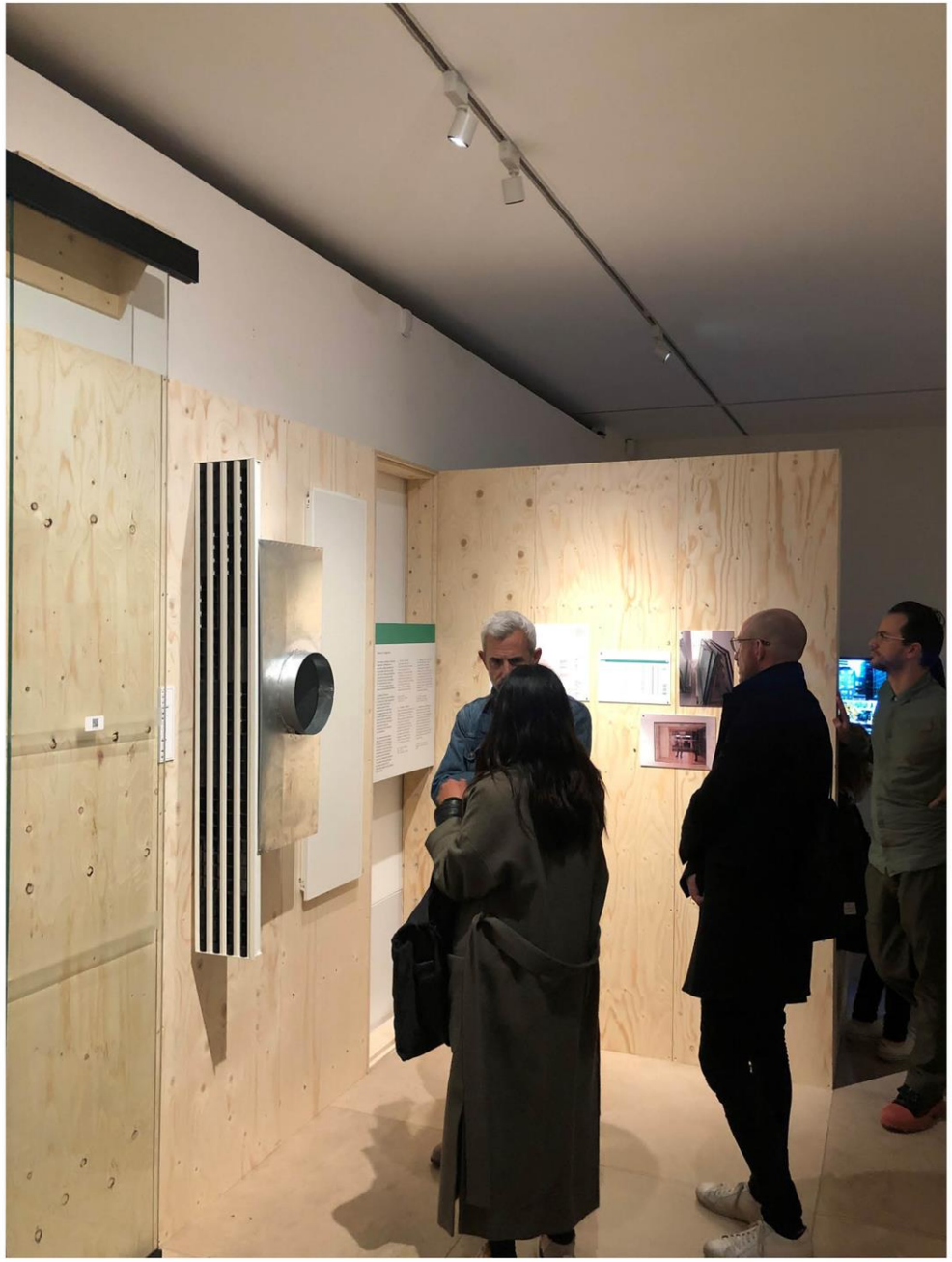
ID - INSTALLATION DATE
7/1/2012

ARCH - FIRE RATING
NR

ID - QR CODE



	ID - Unique Identifier Parent	ID - Unique Identifier Chi...	ID - QR ...	ID - Image	ID - Description	ID - Product Details	ID - Information So...	ID - Manufacturer	Location - EX - Site	Location - EX - Le...	Destination
	GPA-X-00522						C1 - Specialist survey	Radii	20AS	05	
260		GPA-X-00522A			Single Glazed single door		C1 - Specialist survey	Glass Solutions Radii	20AS	05	6 - Downcycle / recycle
261		GPA-X-00522B			Single Glazed	12mm acoustic laminate glass	C1 - Specialist survey	Glass Solutions	20AS	05	RIBA Exhibition
262	GPA-X-00523						C1 - Specialist survey	Radii	20AS	05	
263		GPA-X-00523A			Single Glazed single door		C1 - Specialist survey	Radii	20AS	05	Optima Product Testing
264	GPA-X-00524						C1 - Specialist survey	Radii	20AS	05	
265		GPA-X-00524A			Single Glazed		C1 - Specialist survey	Glass Solutions	20AS	05	6 - Downcycle / recycle
266		GPA-X-00524B			Single Glazed		C1 - Specialist survey	Glass Solutions	20AS	05	6 - Downcycle / recycle
267		GPA-X-00524C			Single Glazed		C1 - Specialist survey	Glass Solutions	20AS	05	6 - Downcycle / recycle
268		GPA-X-00524D			Single Glazed single door		C1 - Specialist survey	Radii	20AS	05	
269	GPA-X-00525						C1 - Specialist survey	Radii	20AS	05	
270		GPA-X-00525A			Single Glazed single door		C1 - Specialist survey	Radii	20AS	05	Optima Product Testing
271		GPA-X-00525B			Single Glazed		C1 - Specialist survey	Glass Solutions	20AS	05	Optima Product Testing
272		GPA-X-00525C			Single Glazed		C1 - Specialist survey	Glass Solutions	20AS	05	Optima Product Testing
273		GPA-X-00525D			Single Glazed		C1 - Specialist survey	Glass Solutions	20AS	05	Optima Product Testing
274	GPA-X-00526						C1 - Specialist survey	Radii	20AS	05	
275		GPA-X-00526A			Single Glazed		C1 - Specialist survey	Glass Solutions	20AS	05	available for reuse
276		GPA-X-00526B			Single Glazed		C1 - Specialist survey	Glass Solutions	20AS	05	available for reuse
277		GPA-X-00526C			Single Glazed single door		C1 - Specialist survey	Radii	20AS	05	available for reuse
278	GPA-X-00527						C1 - Specialist survey	Radii	20AS	05	
279		GPA-X-00527A			Single Glazed single door		C1 - Specialist survey	Radii	20AS	05	available for reuse
280		GPA-X-00527B			Single Glazed		C1 - Specialist survey	Glass Solutions	20AS	05	available for reuse
281		GPA-X-00527C			Single Glazed		C1 - Specialist survey	Glass Solutions	20AS	05	available for reuse
282	GPA-X-00528						C1 - Specialist survey	Radii	20AS	05	
283		GPA-X-00528A			Single Glazed		C1 - Specialist survey	Glass Solutions	20AS	05	available for reuse
		GPA-X-00528B			Single Glazed single door			Radii	20AS	05	available for reuse



Optima

We are leading the Circular Revolution with the Optima Reuse Service

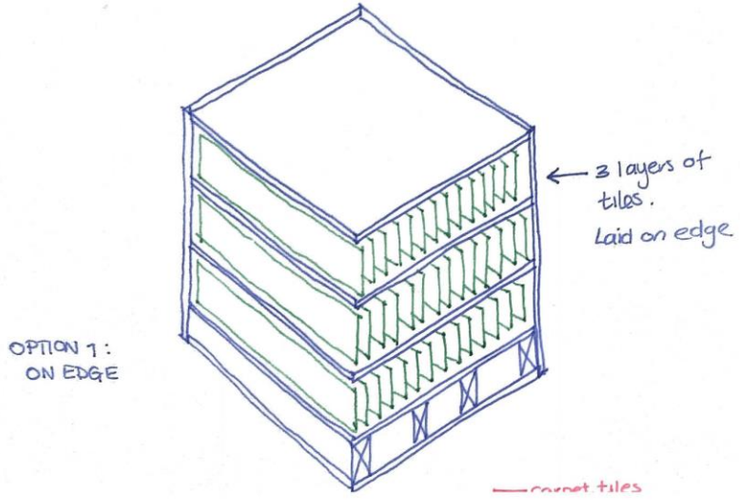
We are leading the circular revolution with our Reuse Service! This groundbreaking UK initiative allows you to reuse any existing Optima glass partitioning systems in your new design. Want to learn more? Head over to our website now.

Learn more

Long Life, Low Energy: Designing for a circular economy

This exhibition discusses the culture of demolition, presents recent examples of best practice retrofit and reuse, and gives a glimpse into the near future with research and ideas into a circular economy of architecture


CTM01
Cleaned


OPTION 1 :
ON EDGE
3 layers of tiles.
Laid on edge
carpet tiles


CTM02
Sprayed


Coffee
Tea

Thank you

Andrew Stammers
HSQE Manager, Optima

Glazed partitioning reuse: challenges and opportunities

Optima

Glazed Partitioning Reuse

Challenges and Opportunities

Andy Stammers, HSQE Manager

Challenges

- Misconceptions about processes
- Types of glass

Challenges

- Door identification (hologram)
- No current glass identification

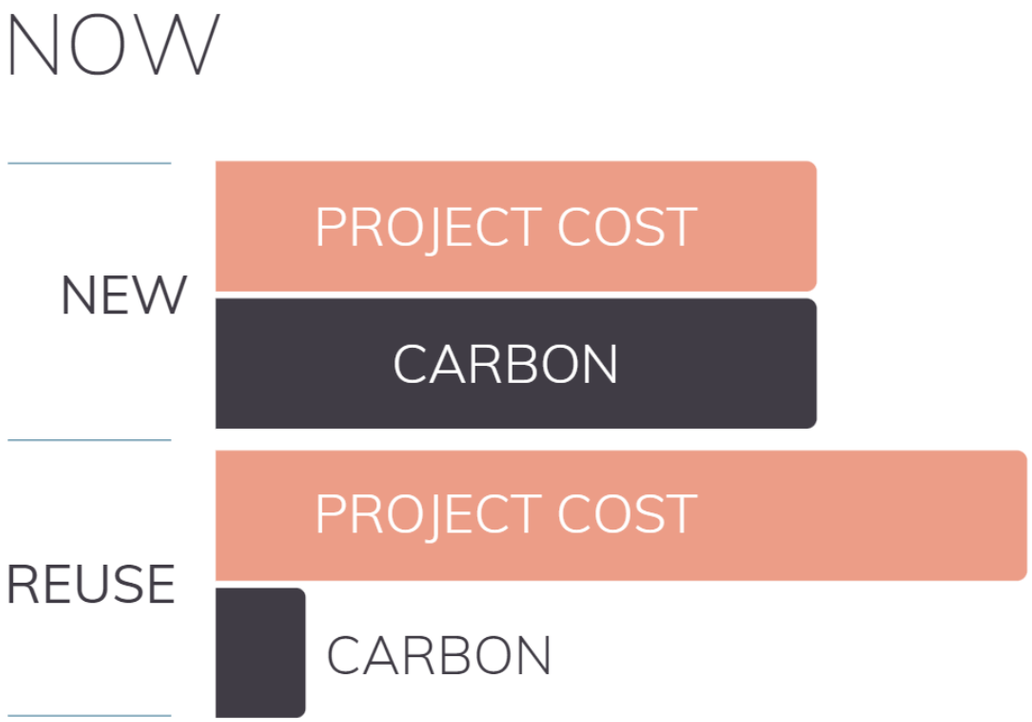
Challenges

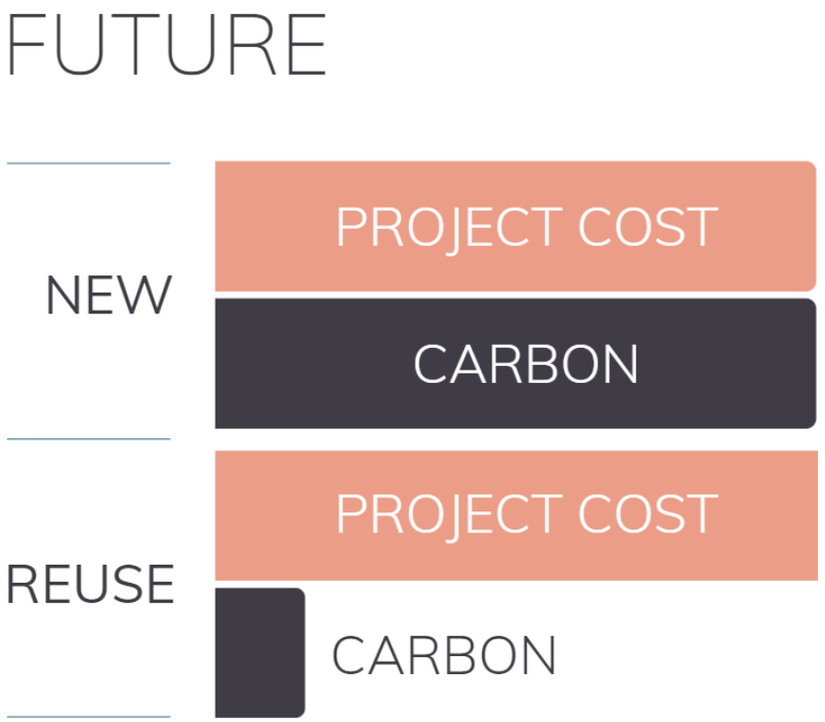
- Glass identification in R&D
- 6 mm x 6 mm QR code
- Radio Frequency Identification (**RFID**) tags

Challenges

- Demount costs
- Storage
- Variety of dimensions

Project cost vs carbon





Conceptual illustration not to scale

Opportunities

- Product design for easy demount
- Use standard dimensions
- Use of modular for design
- Hybrid project

Opportunities

- To realise carbon budget targets
- Add value re BREEAM credits
- Standardisation gives opportunity to reduce waste

“This is an amazing opportunity for our community to work together to drive down carbon impact in the built environment.”

Sara Lopez

Head of Sustainable Operations

BW: Workplace Experts

A contractors viewpoint

SPONSORED BY Troldtekt® Acoustic Solutions since 1935 By Kingspan

FIS FINISHES & INTERIORS SECTOR

BW WORKPLACE EXPERTS

CIRCULARITY IN ACTION

Presented by Sara Lopez
Head of Sustainable Operations

BUILT WITH:
PASSION
PERSONALITY
AND CIRCULAR
ECONOMY

28 FEBRUARY 2024

BW: WORKPLACE EXPERTS
PATH TO NET ZERO

BW'S 2030 GOALS OUR THREE LAYERS

INNOVATION

NET ZERO CARBON

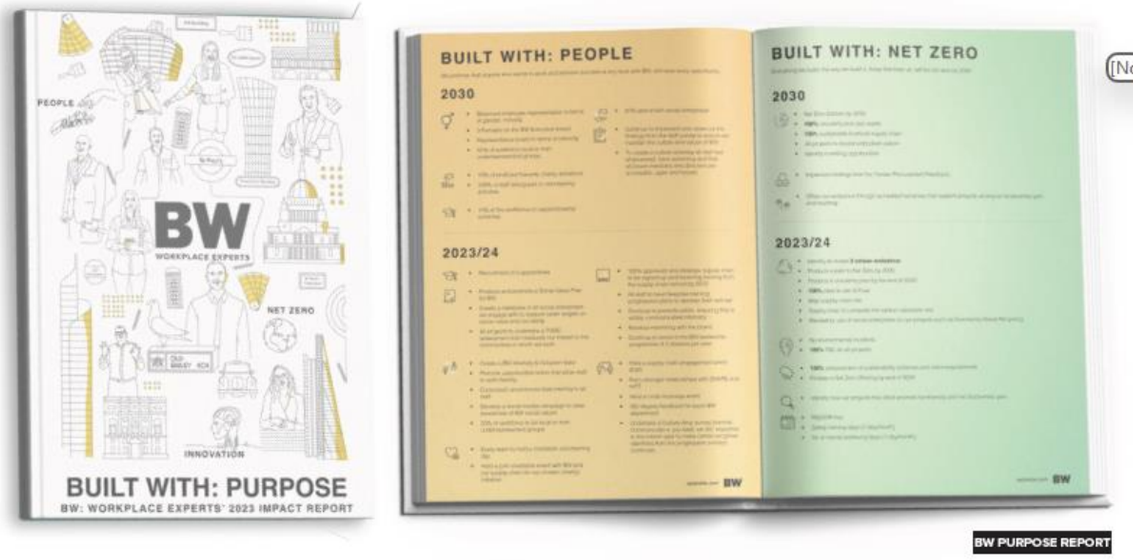
INCLUSIVITY

THREE KEY AREAS

- Net Zero.
- 100% circularity.
- Skills and retaining talent.

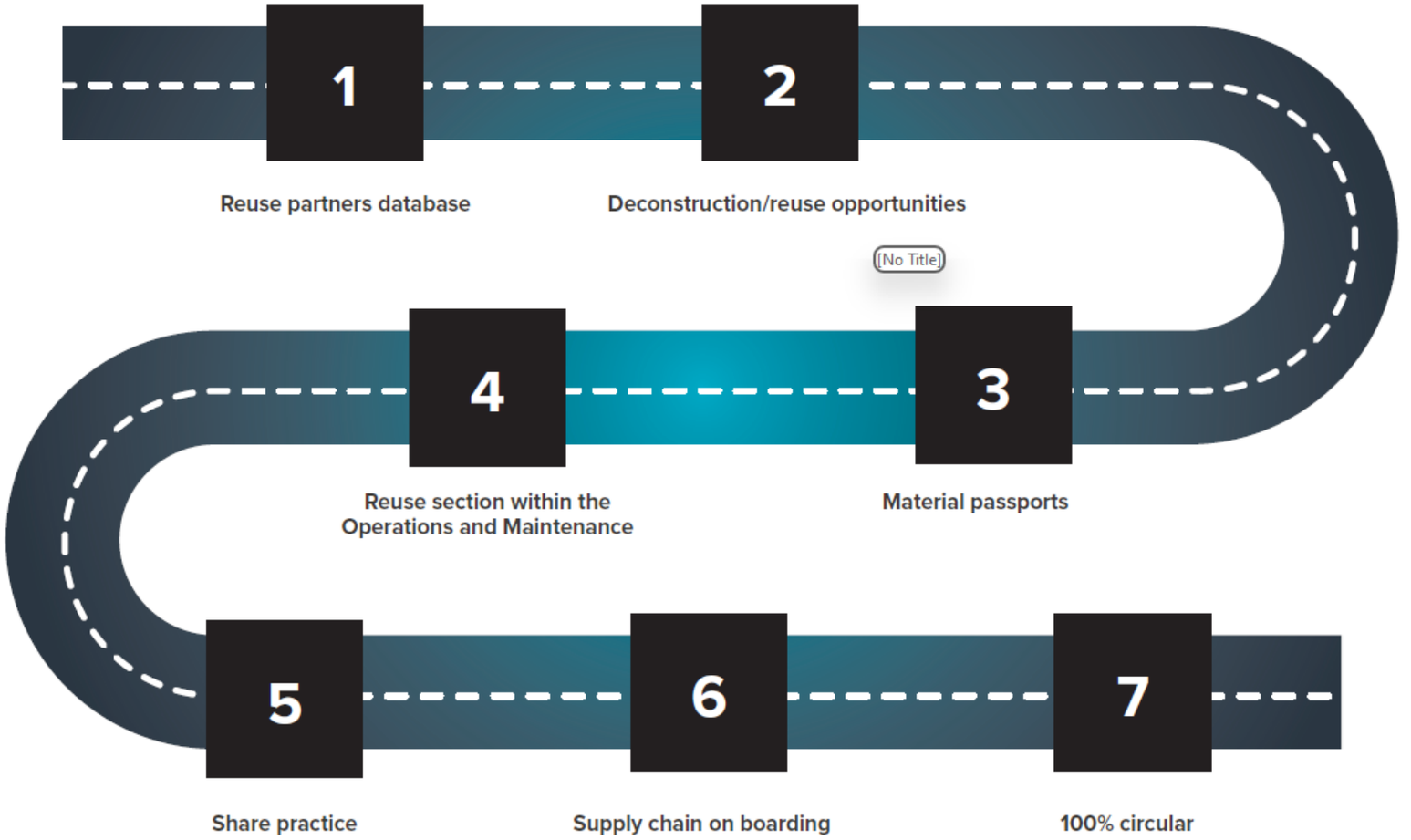
HOW TO GET THERE

- Right clients.
- Develop the right culture.
- Innovate.



BW
WORKPLACE EXPERTS

OUR PATH TO
CIRCULARITY



BW
WORKPLACE EXPERTS

REUSE EXAMPLES
CAT A LIGHTS

1 Reuse partners database

How donations from BW Workspace have supported good causes:

BW WORKPLACE EXPERTS

WCP Westbury Community Project

£84,000
Value Donated To The Community

55,112kg
CO2e Avoided

18,900kg
Diverted From Landfill

BW WORKPLACE EXPERTS

Cornelly Development Trust
www.caddt.org Tel: 01656 670812 enquiries@caddt.org

£19,500
Value Donated To The Community

29,414kg
CO2e Avoided

8,775kg
Diverted From Landfill

750+ Cat A lights were removed from a Cat A installation.

Never used.

New home found via CollectEco.

Donated to Westbury Community Project to be reused.

BW WORKPLACE EXPERTS

REUSE EXAMPLES
COMMUNITY WOOD RECYCLING

1 Reuse partners database

[No Title]

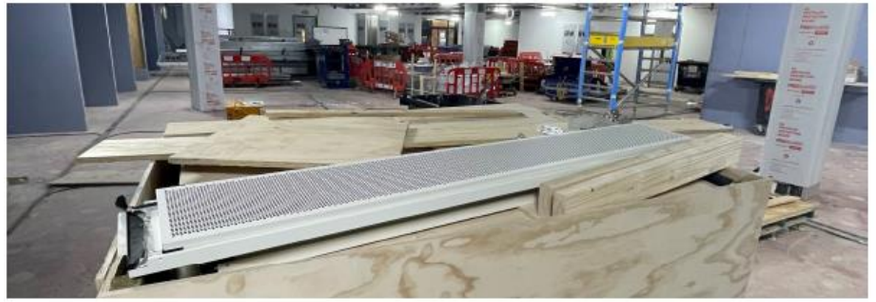
1. Waste wood gathered
2. Collection in local area
3. Taken back to wood yard
4. Used by disability charity group
5. Crafts brought back to BW to raise money for charity.

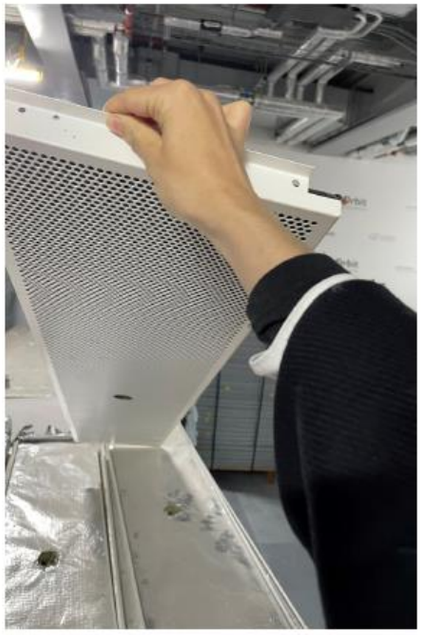
BW WORKPLACE EXPERTS

REUSE EXAMPLES
TRACO UK

- Number of projects that have uused Traco UK in the last 6 monhts: 4
- CO2 emissions saved: X kgCO2e

1 Reuse partners database





BW WORKPLACE EXPERTS

BW REUSE PARTNERS

1 Reuse partners database

Community Wood Recycling
Will collect any non-hazardous wood, including pallets.

E: info@communitywoodrecycling.org.uk

T: 07874 207 822

CollectEco
Will collect furniture, equipment and materials to donate to good causes

W: www.collecteco.co.uk

T: 07436 160 260

Encore Environment
Waste contractor offering redistribution of reusable assets to charities.

E: info@encore-environment.com

T: 01604 496 987

RecoLight
Re-use, remanufacture and recycle service for all WEEE lighting.

E: re-use@recolight.co.uk

T: 020 8253 9750

RecoLight
Emmaus
Collect, upcycle and donate furniture to local communities.

E: nicky@emmausgreenwich.org

T: 0300 123 2001

Rype Office
Collection and remanufacture of office furniture

E: susan@rypeoffice.com

T: 033 3358 3330

Envirocycle London
Collecting carpet tiles, broadloom, underlay and various textile wastes.

E: info@envirocyclelondon.co.uk

T: 07549 448 123

RMF Raised Modular Flooring
Collection of raised access flooring and supply of refurbished systems.

E: info@rmf-services.co.uk

T: 01926 425 289

A Good Thing
List small items for free (larger groups of items are £99) and charities can get in touch to collect.

W: www.agoodthing.org.uk

Globechain
Connecting enterprises with charities/small businesses to redistribute unneeded items.

E: may@globechain.com

T: 07779 292 371

REVAMP YOUR SITE STRATEGY

Tap into the power of circularity with the top BW pioneers!

Traco UK
Providing companies with environmental/socially responsible clearence, storage and relocation services.

E: Jason.Bentley@tracouk.com

T : 07962 017046

BW WORKPLACE EXPERTS

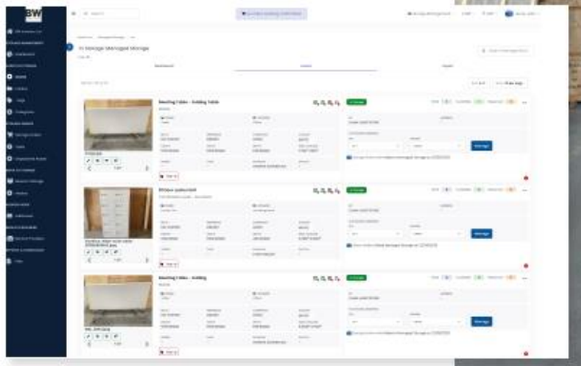
CASE STUDY
CAMA

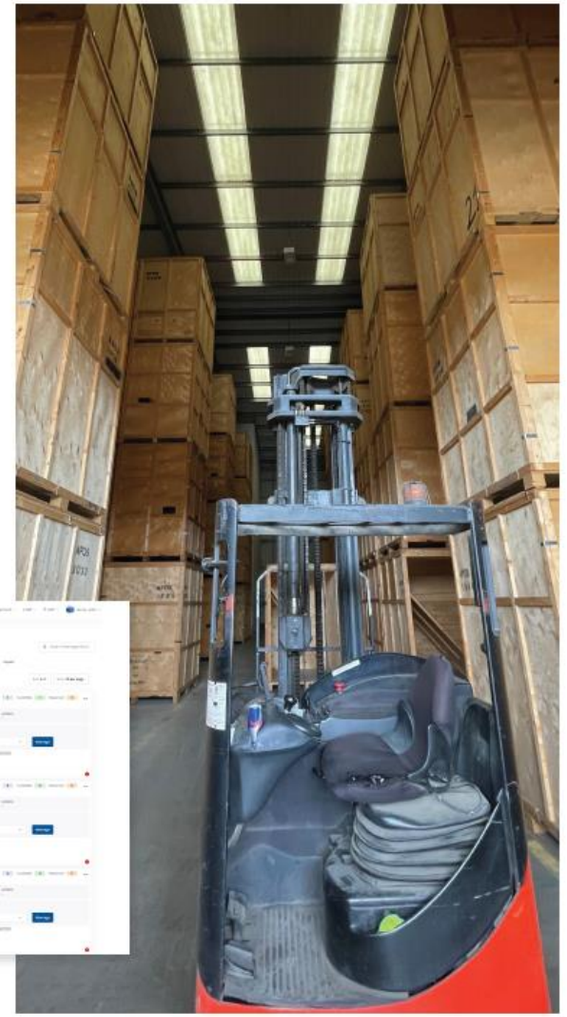
1 Reuse partners database

7 storage units used for site setup equipment.

All items logged in CAMA database with material passports.

100% items reused on new projects.





BW WORKPLACE EXPERTS

REUSE EXAMPLES
PROJECT SCOUT

PROJECT SCOUT VS TYPICAL CAT B COMPARISON

SQUIRE PATTON BOGGS

COST
£4.75M
Approximately 50% cheaper due to the reuse of materials and slight savings on preliminaries/program.

SIZE SQ FT
54,000

COST PER SQ FT
£87.52

PRE-CONSTRUCTION (D&B FROM STAGE 3)
10 WEEKS INCLUDING VALIDATIONS
Slightly more time is needed to validate and survey the extent and feasibility of reuse. In the future, having disassembly manuals would be helpful and could save some time.

CONSTRUCTION
21 WEEKS
Construction is slightly faster due to less lead time, although installation may take longer. Overall, the construction process was very similar.

111 tCO2e
WHOLE LIFE CARBON ASSESSMENT
(AS BUILT)
The initial design aimed for an embodied carbon footprint of 59 tons of CO2e, but the final count wasn't as good as expected due to*

*Larger measured area of plasterboard usage Larger area of blind usage. - Removal of the ability of reuse of certain items due to sheet materials format chosen. - Ply used for patressing and sub bases.

TYPICAL CAT B PROJECT

COST
£8.1 - £11M

SIZE SQ FT
-

COST PER SQ FT
£150 - £200

PRE-CONSTRUCTION (D&B FROM STAGE 3)
6 - 8 WEEKS

CONSTRUCTION
20 - 30 WEEKS

219 tCO2e
WHOLE LIFE CARBON ASSESSMENT
(AS BUILT)
Based on Perkins+Will calculation for designing according to current guidelines, all new products and disposal of all products at the end of lease

CIRCULARITY IN ACTION | BW WORKPLACE EXPERTS

BW WORKPLACE EXPERTS

REUSE EXAMPLES
MAZARS

REUSED ELEMENTS

- Optima glazing.
- Raised access floor.
- Carpets.
- SAS System 330 ceiling.
- Existing LCMs and luminaires.
- Sprinklers.
- Fire alarms.
- FCUs.
- Ductwork and grilles.
- Hot and cold water systems.
- Drainage.

BUILT WITH:

1. REUSED OPTIMA GLAZING
2. REUSED LUMINAIRES
3. REUSED GRILLES
4. REUSED CARPET TILES
5. REUSED CEILING TILES

MAZARS

COST	£5.8M
	Crudely 50% cheaper due to reuse of materials and slight saving on prelims/programme.
SIZE SQ FT	57,000
COST PER SQ FT	£101.75
PRE-CONSTRUCTION (D&B FROM STAGE 3)	3 WEEKS (STANDARD BUILDING CONTRACT NOT D&B)
CONSTRUCTION	20 WEEKS
	Construction slightly faster as less leadtime, install can take longer but overall construction very similar.

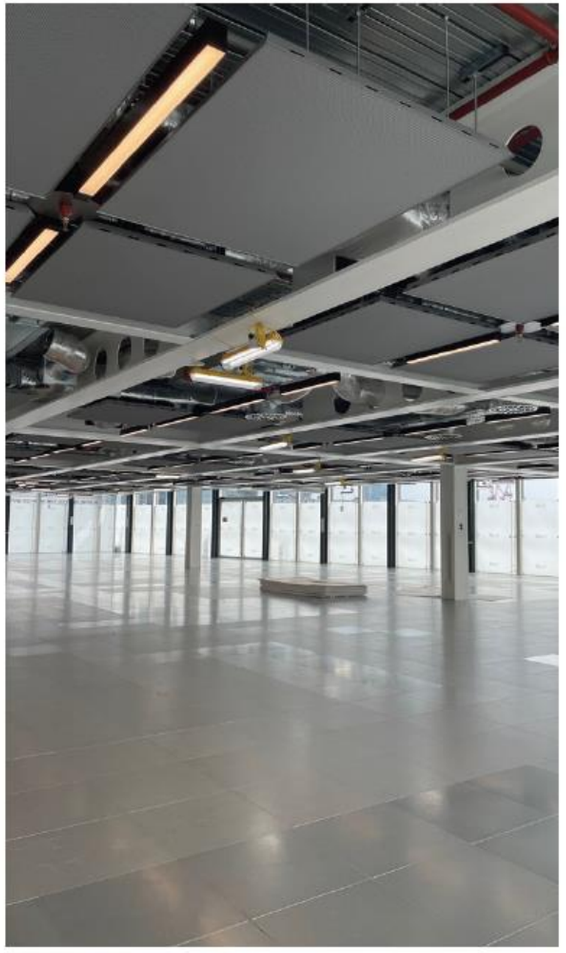
TYPICAL CAT B

COST	£8.1 - £11M
SIZE SQ FT	-
COST PER SQ FT	£150 - £200
PRE-CONSTRUCTION (D&B FROM STAGE 3)	6 - 8 WEEKS
CONSTRUCTION	22 - 30 WEEKS

MAZARS VS TYPICAL CAT B COMPARISON

mazars

REUSE EXAMPLES
PARTNERS GROUP



Lighting - basebuild lights were reused into the design for meeting rooms and comms rooms. For the large remainder of lights, BW reached out to Lightingzone (manufacturer) for a take back, reuse and recycle of the components. This was arranged direct and collections made by LightingZone.

Acoustic Panels - large acoustic panels as part of the CAT-A were not integrated into the CAT-B scheme so BW were asked to find a home for the panels. BW approached a familiar subcontractor (ILE), who specialise in acoustic panelling, for them to remove, store and find a new home. Currently in storage but likely to be used in a design and build scheme or donate to schools.

Grilles - Basebuild grilles incorporated within the CAT-B design therefore not thrown away. Any removed were provided to the landlord for spares.

BW WORKPLACE EXPERTS

Partners Group
REALIZING POTENTIAL IN PRIVATE MARKETS

MATERIAL PASSPORT
PILOT PROJECT

KEY ELEMENTS

- 126,700 sq ft of CAT B fit out.
- Industrial inspired workspace, in Old Street district.
- BREEAM Outstanding and WELL Platinum.

WHAT WAS DELIVERED?

- Tracking of 813 unique materials/products into the new office space via Qflow.
- Mapping 24% of the priority items, with product documentation. This included:
  - Material data sheet.
  - EPD.
  - Fire rating/ certificate.
  - Acoustic rating/ certificate.
  - Warranty.
- Creation of a digital bank of materials, which can support future maintenance and recovery of items for the circular economy.

BW WORKPLACE EXPERTS

THANK YOU

We love having guests.

Visit our head office in London's historical Old Bailey or get in touch to talk about how we can help create your new workplace.

5 Old Bailey
London
EC4M 7BA

Tel. +44 (0)207 593 9900
Email. info@wearebw.com

BW
WORKPLACE EXPERTS

Dr Katherine Adams
Director, Reusefully

The importance of urban miners

SPONSORED BY Troldtekt® Acoustic Solutions since 1935 By Kingspan

The importance of urban miners

Katherine Adams
Reusefully

katherine@reusefully.co.uk

WorkPlace Design Show, FIS Conference: 28th February 2024

About Reusefully

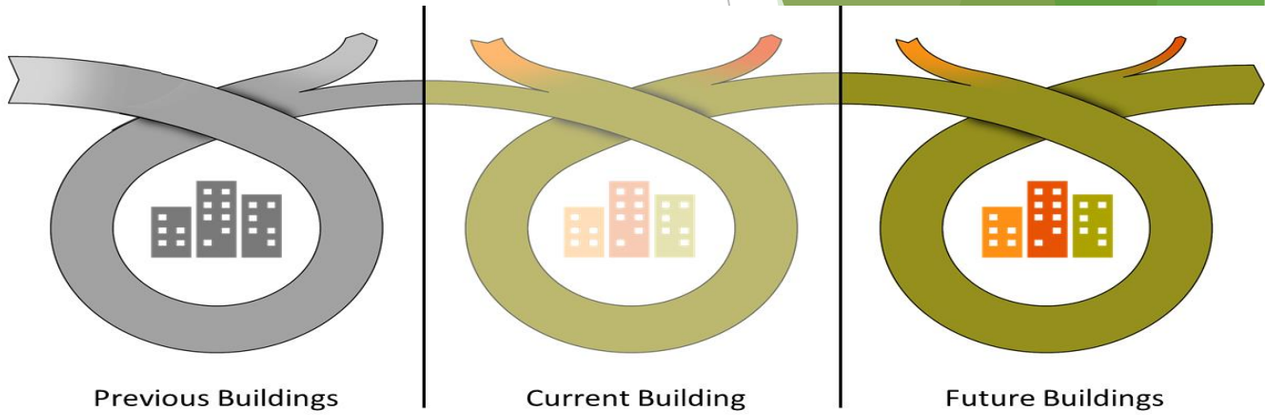
reusefully

- Reusefully is an organisation created to provide **expert circular economy advice and support within the built environment.**
- We enable the **practical implementation of circular economy thinking** throughout the construction supply chain and provide evidence-based support and advice for related policy development. We collaborate and work with others who genuinely share this objective and value our commitment to delivering effective & impactful project outcomes.
- We address **material and resource efficiency, embodied carbon and net zero, design for deconstruction, waste prevention and waste management, reuse and recycled content**. Collectively, Reusefully brings together over 100 years of experience, working across multiple parts of the value chain, from small practical projects to large scale R&D, for a wide variety of clients. **www.reusefully.co.uk**

Recover end-of-life building components

reusefully

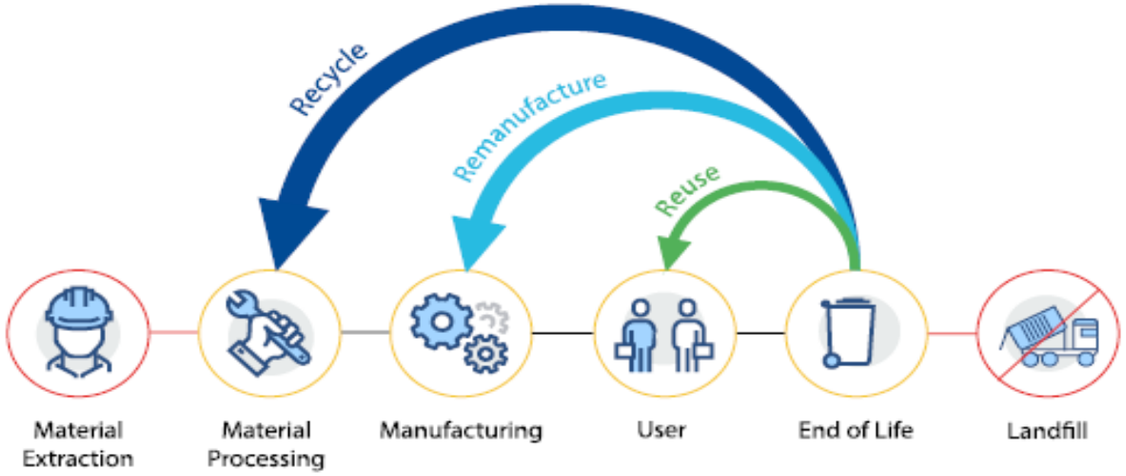
- aka **‘Urban mining’**
- **Buildings as Material Banks**
- Construction, demolition, refurb/retrofit, repairs & maintenance
- Requires input throughout project stages and across value chains



Donors of building product and materials

Recipients – reducing carbon, cost and preserving heritage

Designing for adaptability and **future reuse** = longer lived assets & future bank of resources



Buildings as Material Banks

Designing for Circularity

Circular business models/ procurement/data

Recover end-of-life building components

reusefully

Why?

- **Avoid waste**

  Environmental – reduced pollution, avoid filling up landfills

  Financial – gate fees, maximising value extraction per unit resource

  Social – ‘throwaway culture’, valuing what we have

- **Avoid virgin materials**

  Environmental - carbon, biodiversity, pollution from extraction and manufacturing

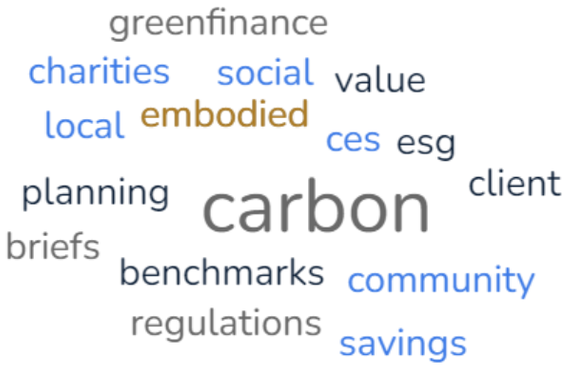
  Financial – sale of recovered items; reuse and recycling within own assets; longevity of assets

  Social – support crafts and industries involved in reclamation rather than extraction

- **Assurance and resilience of material supply**

  Local/self-sufficiency – resilience to supply shocks

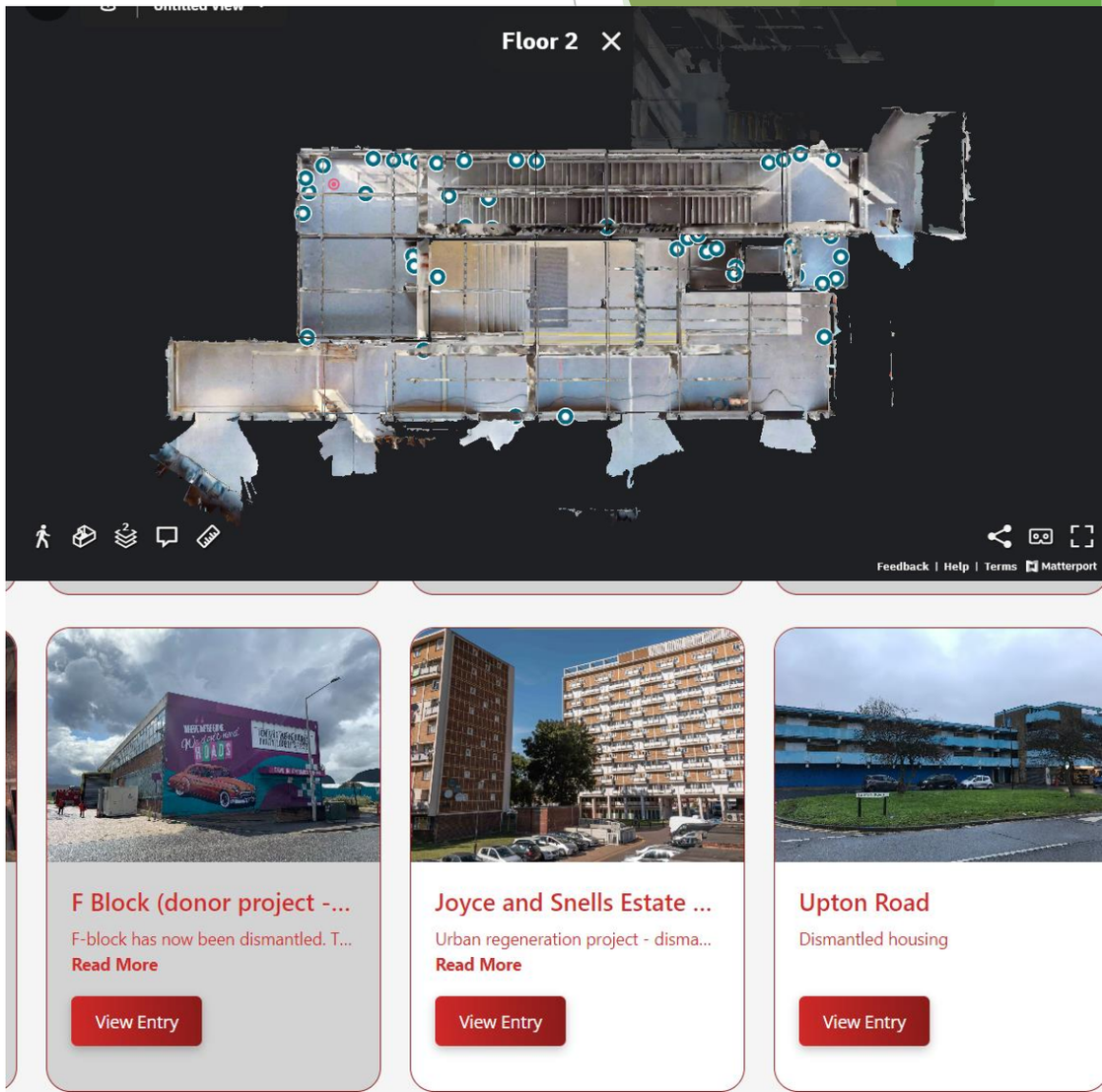
  Responsible sourcing – shorter, simpler, supply chains



Tools and techniques to support reuse

reusefully

- Designing with reuse (what's in the fridge/ material bank?)
- Integrate (on & off site) requirements into procurement activities
- Matterport scans – quantification and reporting
- Exchange platforms – rehoming what cannot be used onsite
- Supplier takeback/exchange – redistributing
- Resource tracking – roles & responsibilities, recording and monitoring

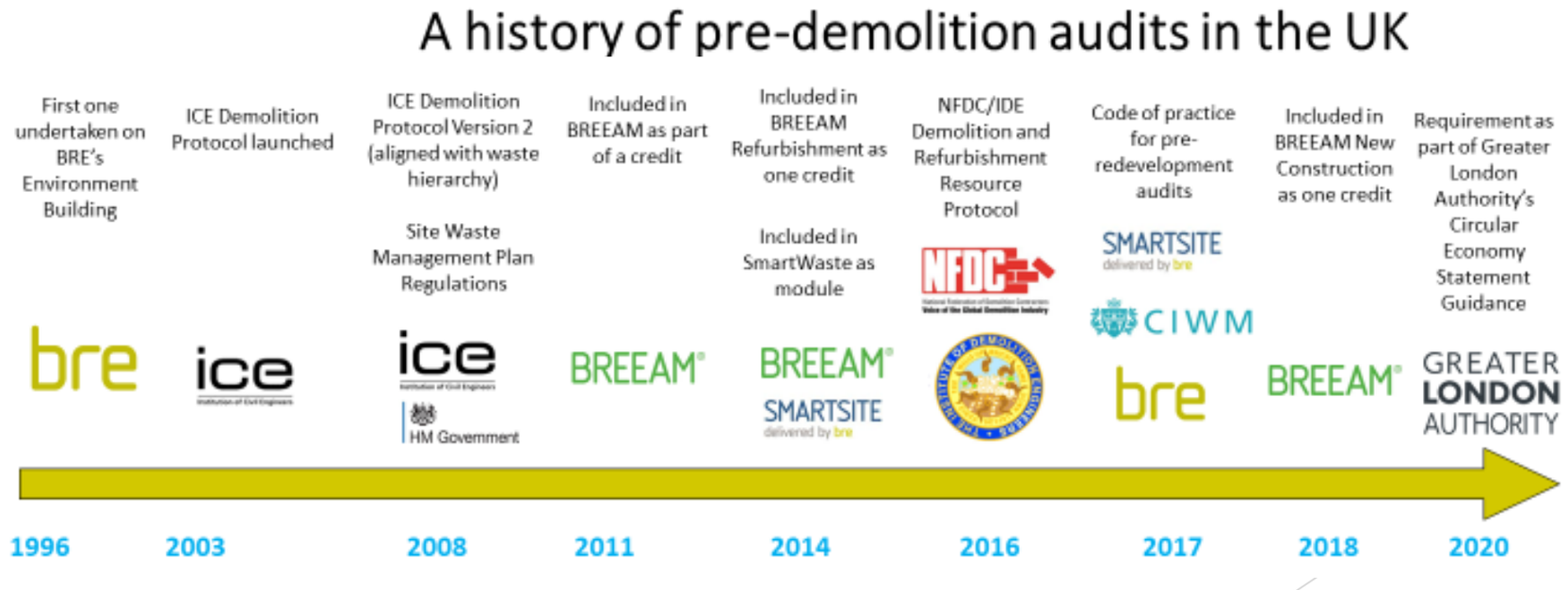


Material audits

reusefully

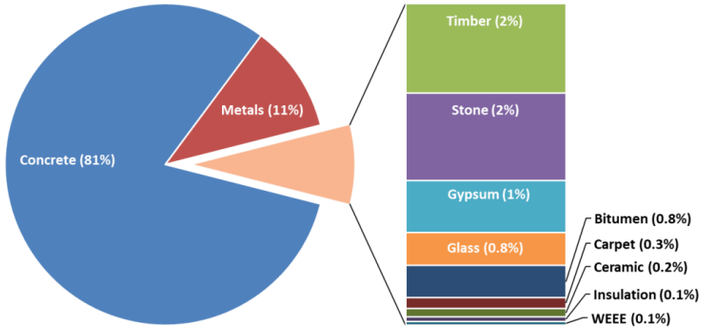
Assessment to determine what components and materials can be recovered at end-of-service life in an existing building

- Pre-demolition audits
- Pre-refurbishment audits
- In-use material audits (eg to optimise asset management)



Material audits – Analysis & Reporting

- Identify materials and components present, describe condition & location, photos
- Quantities (tonnes, m^3, m^2, other) of key components/materials
- Targets for % reuse, recycling, energy from waste/other, landfill
- Bulk volume / Number of skips
- Embodied carbon (avoided thru reuse)
- **Detailed guidance: Methods/procedures, Legal requirements, Companies, Initiatives**



Overall quantities

Table 2. Estimated concrete arisings and potential recovery amounts

Source/Component	Tonnes	Volume (m^3)	Suitable for reuse (t)	Suitable for recycling* (t)
In-situ concrete floors	15033.5	6264.0	0.0	14883.2
In-situ concrete walls	8884.8	3702.0	0.0	8796.0
Floors - Omnia deck planks	2815.3	1173.0	0.0	2815.3
RC beams	2772.9	1155.4	0.0	2745.2
Other RC columns	1492.3	621.8	0.0	1477.4
Façade columns	801.0	333.8	160.2 t	632.8
Bases for plant equipment	178.0	74.1	0.0	178.0
Concrete paving slabs	52.3	21.8	49.7 t	2.6
Foundations	44.9	18.7	0.0	44.5
Blockwork masonry walls	22.4	16.0	0.0	22.1
LWC blocks (Omnia floor system)	14.9	10.5	0.0	14.9
Cement mortar	2.1	1.1	0.0	2.1
Total	**32114.3 t**	**13392.2 m^3**	**209.9 t**	**31613.9 t**

Reuse opportunities

Item	Materials	Tonnes potentially suitable for reuse
Raised access floor panels	Chipboard, Steel	900.9
Granite cladding panels	Stone	467.1
Large pebbles (rooftop)	Stone	198.2
Façade columns	Concrete, Steel (rebar)	176.3
Perforated metal ceiling panels (incl. insulation)	Steel, Insulation	122.3
Carpet tiles	Carpet, Plastic	85.5
Stone paving	Stone	81.5
Concrete paving slabs	Concrete	49.7
Glass office partitions	Glass, Aluminium	29.3
Hanging strip lights in offices	WEEE	23.3
Ceramic floor tiles	Ceramic	22.9
Timber doors (plus glass vision panels)	Timber, Glass, Metals	21.5
Steel stairs	Steel	19.3
Handrails	Steel, Aluminium	15.0
Reconstituted stone tiles	Stone	13.9
Black reconstituted stone cladding panels	Stone	11.3
Ceramic wall tiles	Ceramic	11.0
Supporting structures for rooftop plant	Steel	7.6
WC pans	Ceramic	4.8
Rectangular light panels	WEEE	4.0
Ceramic sinks	Ceramic	3.6
Glass blocks - basement main lift area	Glass	3.4
Urinals	Ceramic	3.2
Laminated MDF kitchen cabinets, shelving and worktops	MDF (laminated)	3.1
Recessed downlights	WEEE	2.1
Hand dryers	WEEE	1.9
Timber handrails	Timber	1.7
Bulkhead lights	WEEE	1.4
Misc rooftop metal items	Metals	1.0
Total		**2286.6 t**

Skip requirements

Table 10. Bulk volume and number of skips required

Material	Calculated volume	Waste volume	Skips number (8 yard)
Concrete	13392.2	16,070.6	2628
Timber	1240.4	1,984.6	325
Metals	565.9	1,697.8	278
Gypsum	672.9	874.8	144
Insulation	725.7	870.8	143
Stone	363.2	435.8	72
Bitumen	165.3	198.3	33
Carpet	133.7	160.4	27
Glass	130.2	156.2	26
Ceramic	34.4	41.3	7
WEEE	32.7	39.2	7
Total	**17,456.4 m^3**	**22,529.9 m^3**	**3696**

Carbon implications

Table 12. Estimated embodied ('embedded') carbon of materials present, and the potential embodied carbon avoided if reuse opportunities are exploited

Material	Tonnes	tCO_2 embedded	tCO_2 avoided (reuse only)
Aggregate	208.7	1.6	1.5
Aluminium	10.9	71.9	20.9
Asphalt	300.0	15.0	0.0
Softwood	49.8	14.9	6.0
Stainless steel	0.4	1.8	0.0
Steel	3496.4	5419.4	91.3
Stone	640.3	448.2	401.6
Vinyl flooring	10.3	32.9	0.0
WEEE	35.0	-	-
Total	**39,532.3 t**	**12,699.1 tCO_2**	**2114.0 tCO_2**

Resource tracking & implementation

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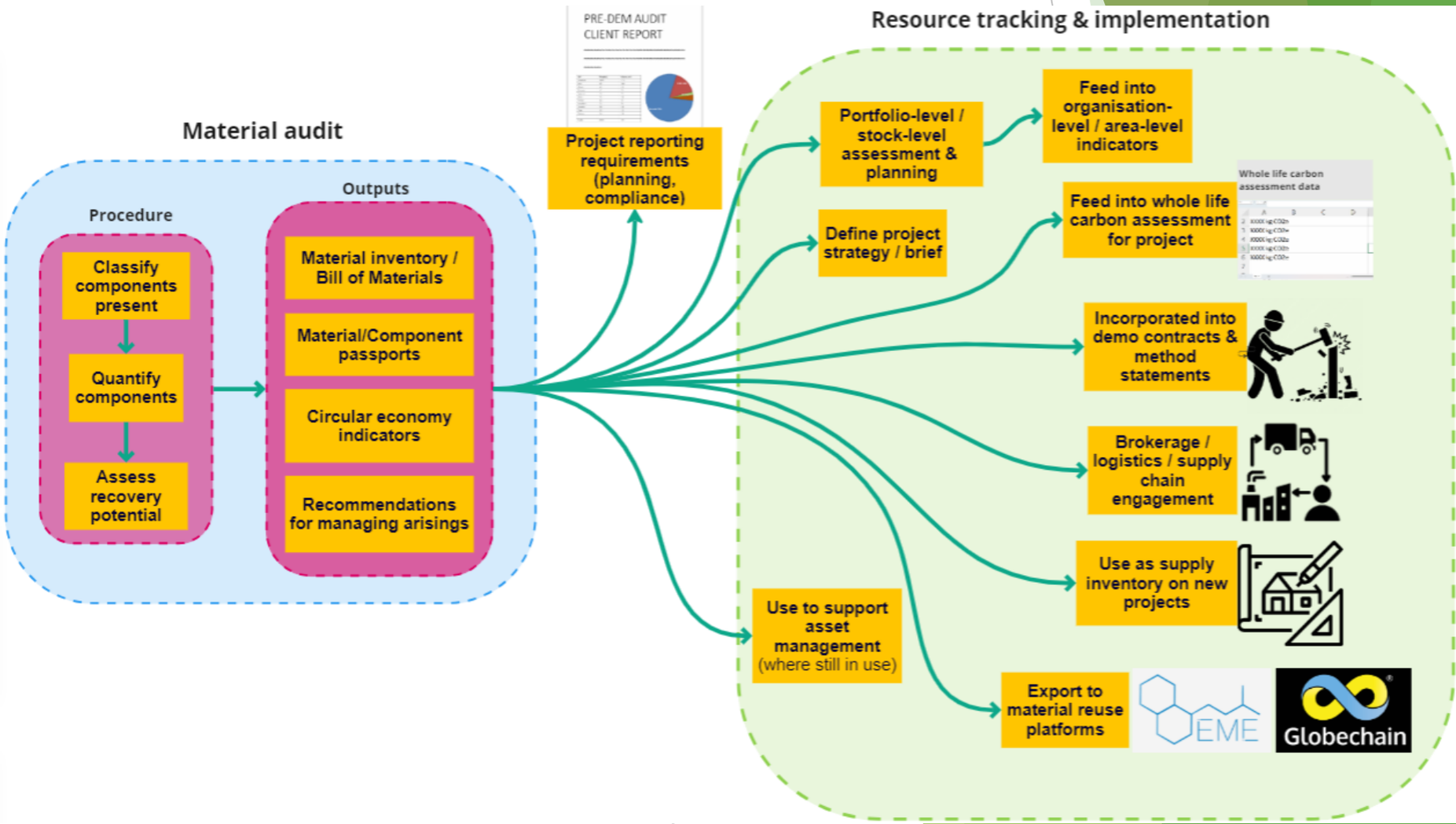
<u>Material audit</u>: Snapshot in time

<u>Resource tracking</u>:

- Continually update understanding of components & materials present
- Successive material audits, either of full building or target parts)
- Detailed logistical / practical planning & implementation
- Log decisions/actions
- Actual recovery rates vs targets/forecasts
- Lessons learned



Harvest mapping

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Source: Superuse Stuidos

Reuse potential – internal space

Raised access flooring, ceiling tiles, glass partitions, carpet tiles, lighting, doors, sanitaryware, lighting, architectural / retro salvage, furniture (loose and fixed), kitchen / bathroom cabinets and fittings, wooden flooring/ skirting/ studwork, cabling, ductwork, small electrical etc…

+	-
Removability and simplicity of deconstruction	Health and safety risks
Good condition	Poor condition / damage / disintegration
Quantity (large)	Out of fashion
Considerable environmental benefit	New more interesting materials
High value (authenticity, historic interest, etc.)	Strict technical requirements
Economic value	High recycling value
Possible logistics	
Homogeneity and standard dimensions	
Management of risks	

Circular business models

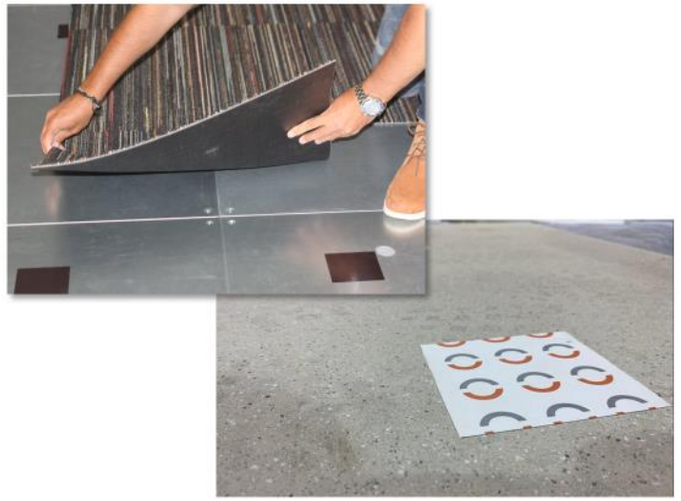
- Supplier takeback and remanufacture, e.g.
  - Carpet tiles (eg Interface)
  - Ceiling tiles (eg SAS)
  - Flat glass (closed loop recycling)
- Leasing e.g.
  - Façade (TU Delft Netherlands)
  - Lighting
  - Lifts
  - Carpet tiles
- Third party remanufacture, e.g.
  - Raised Access Flooring
  - Heating and cooling systems
  - Lighting

Circlease™ Floor Leasing

CIRCLEASE FLOORING

POWERED BY IOBAC

- "Flooring-as-a-service"
- Monthly fee for usage, rather than material ownership
- All elements chosen with loneivity, modularity, disassembly and reuse at end of lease in mind
- Powered by IOBAC reversible contamination-free floor fixings
- Supported by leading flooring manufacturer brands



A Guide to Circular Floor Leasing - IOBAC

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Costs/residual value

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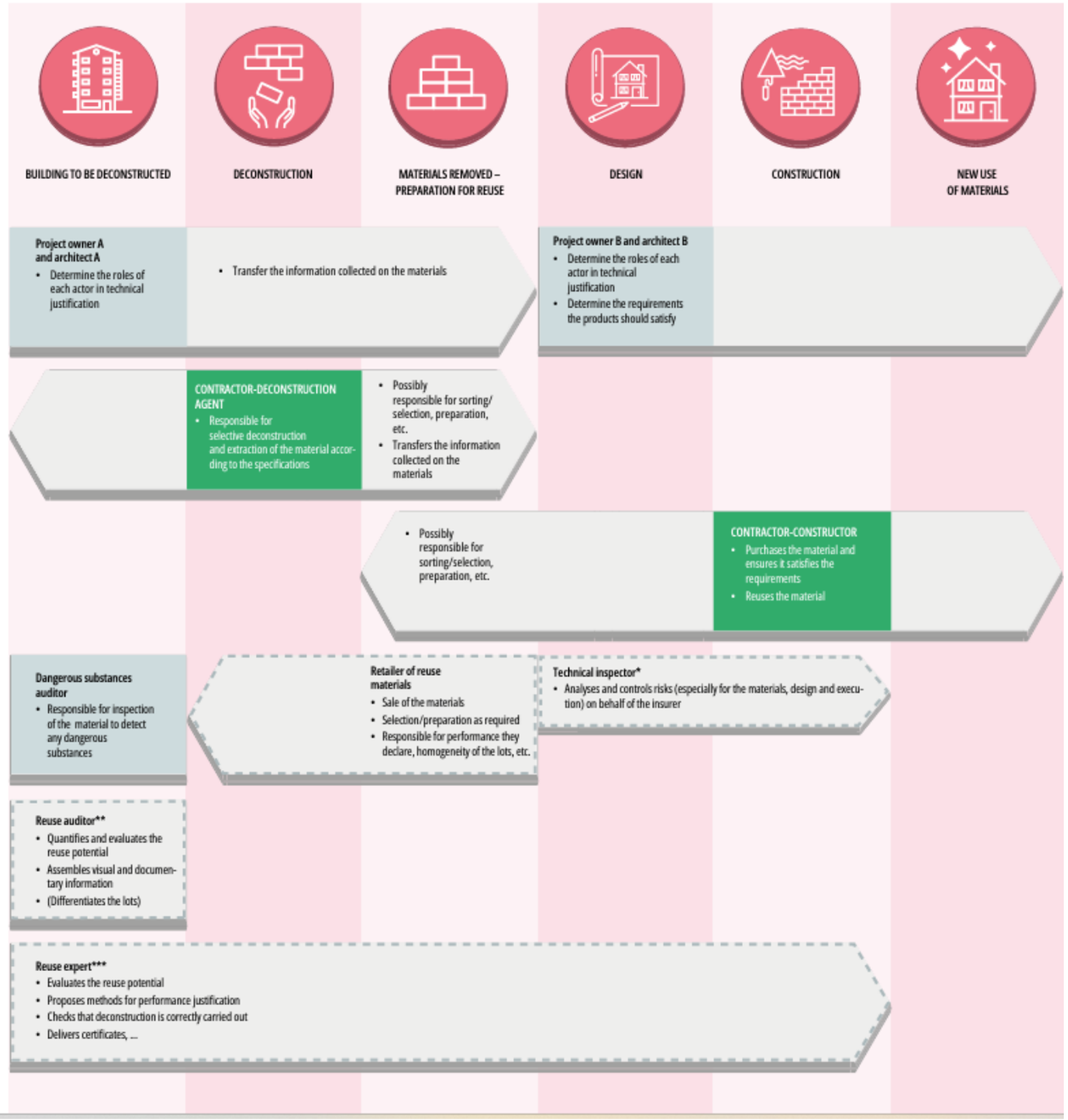
TILES	YIELD FROM REMOVAL	COST OF REMOVAL	CLEANING SERVICE	SALE PRICE OF UNCLEANED MATERIALS	SALE PRICE OF CLEANED MATERIALS	TREATMENT OF PROTEC-TION AND FINISHING	SALE PRICE OF NEW PRODUCTS
Unglazed porcelain tiles	~15 m^2 of tiles in good condition/person.day[20]	15 - 25 €/m^2	25 - 35 €/m^2	25 - 50 €/m^2	50 - 85 €/m^2		
Earthenware wall tiles		15 - 25 €/m^2			25 - 50 €/m^2		
Cement based tiles	~15 m^2 of tiles in good condition/person.day[21]	25 – 50 €/m^2			55 - 125 €/m^2		
Unglazed terracotta tiles		15 - 25 €/m^2			50 - 90 €/m^2	8 - 16 €/m^2	25 - 90 €/m^2

Source: FCRBE project

Residual value estimates:

- raw materials price
- estimated service life
- quality
- detachability
- transport costs
- maintenance costs
- repair costs



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Professionalise

Processes

Training

Business as usual!

LINK – Investigating the use of AI to facilitate reuse

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- 18-month project, funded by Innovate UK, to investigate **the use of artificial intelligence and machine learning** to encourage the reuse of materials from fit-outs
- Development focuses on **image recognition technology** and a mobile app linked to a material reuse platform

Thanks for listening!

Dr Katherine Adams

katherine@reusefully.co.uk

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