SUPPLY CHAIN SUSTAINABILITY SCHOOL

Designing out Waste with Zero Waste Scotland - Workshop

28 June 2023

10:00-12:00

SUPPLY CHAIN SUSTAINABILITY SCHOOL

Welcome & introductions

Andrew Wilson

Programmes Manager

Supply Chain Sustainability School

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@SupplyCSSchool

Introduction

Designing out Waste Workshop - Outcomes

At the end of this workshop you will:

- Have an improved understanding of the circular economy and the drivers for designing out waste
- Have a feel for what is happening policy-wise on these themes in Scotland
- Have considered opportunities to design out waste within your own organisation and projects
- Be able to articulate the challenges and opportunities to your colleagues, customers and supply chain.

Please Participate

If you have **QUESTIONS**, please feel free to speak up or write them down in the chat box

Cameras on and earphones help!

Please mute during presentations but feel free to unmute and speak up if you have a question

Please, ensure your line is **UNMUTED** during group discussions and **VIDEO** is on

We will use the platform **Google Jamboard** to engage in different activities

SLIDES will be distributed afterwards

We need your feedback please

This link will be posted in the chat:

LINK: https://forms.office.com/e/sNHfVxxNNH

SUPPLY CHAIN SUSTAINABILITY SCHOOL

Introductions, using Jamboard and Chat box

- We will introduce Jamboard shortly – you have to open this as an interactive document via your browser – use the link we sent you by email or the one we have added in the Chat function of Zoom

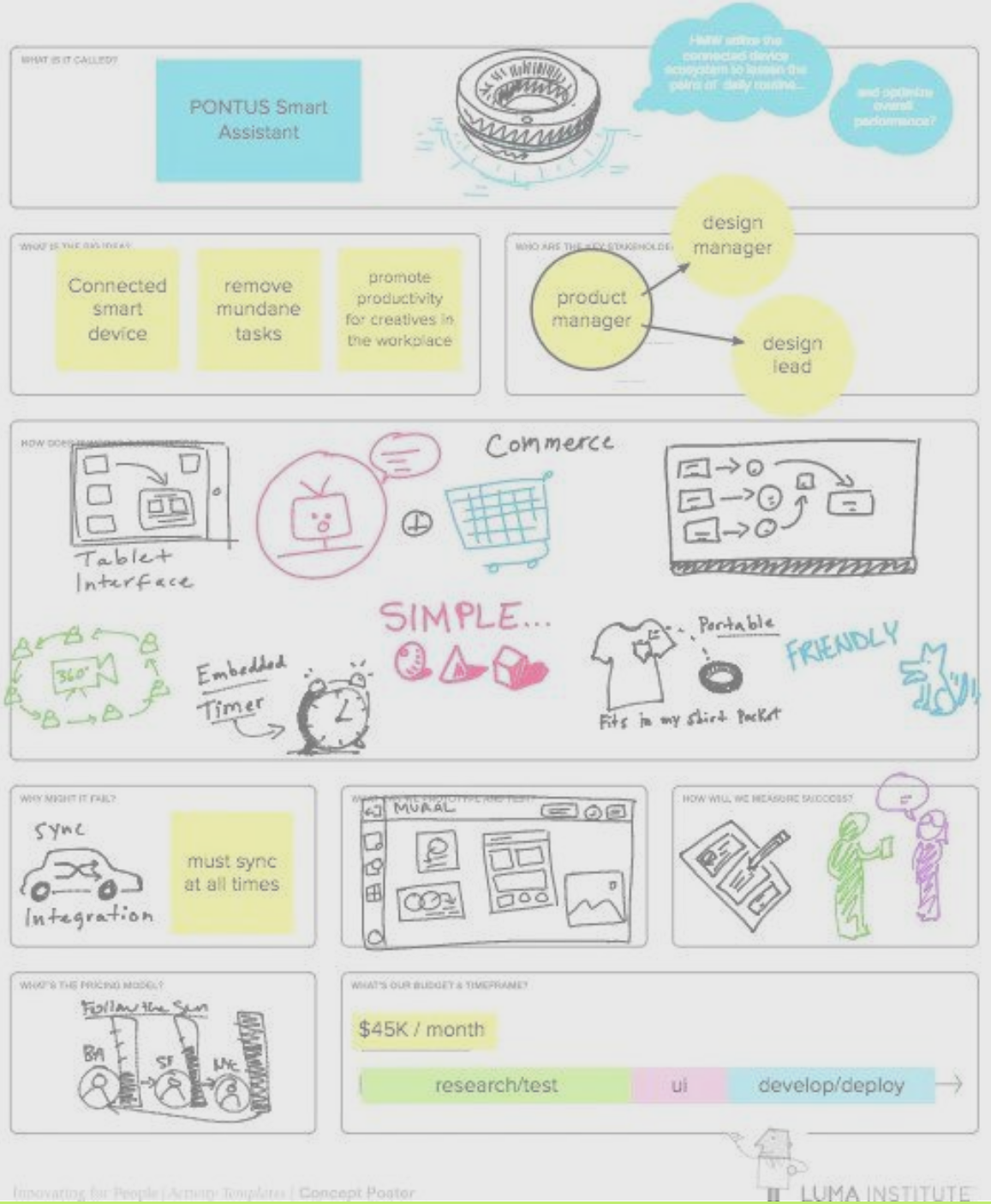
- If you can't access Jamboard or have something else to ask us, just use the Chat function. Again this is in the Zoom toolbar. Use this to add other comments, add your questions, or just introduce yourself to the group

- Feel free to shout out – we're very happy to be interrupted.

Zero Waste Scotland - 28th June 2023 Designing Out Waste Workshop - Google Jamboard

Jamboard

- ***FOLLOW*** the **link** we sent to your email
- ***CREATE*** a post it note, double click on an empty space and start writing
- To ***MOVE*** your post it note around, click on and drag it
- To ***DELETE*** your post it note, click on it and press the 'Delete' button on your keyboard
- PLEASE DON'T press the "clear form" button!



SUPPLY CHAIN SUSTAINABILITY SCHOOL

Welcome & introductions

Nick Ribbons

Partner (Construction)

Zero Waste Scotland

Nick.ribbons@zerowastescotland.org.uk

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Construction Waste and Circular Economy Poll

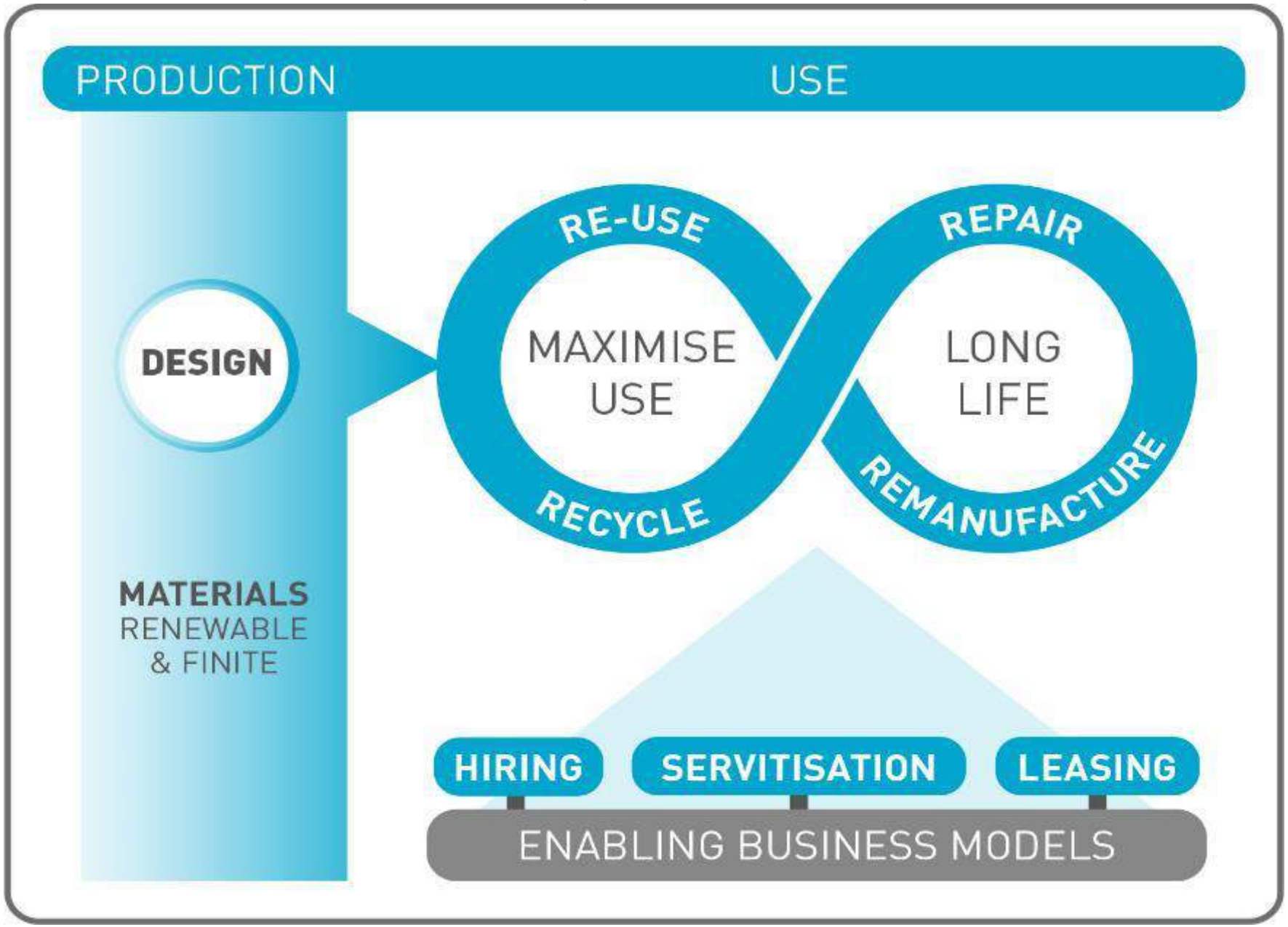

Construction generates an estimated 50,000 tonnes of plastic packaging waste every year
3 X more packaging waste than all UK households combined

About Zero Waste Scotland

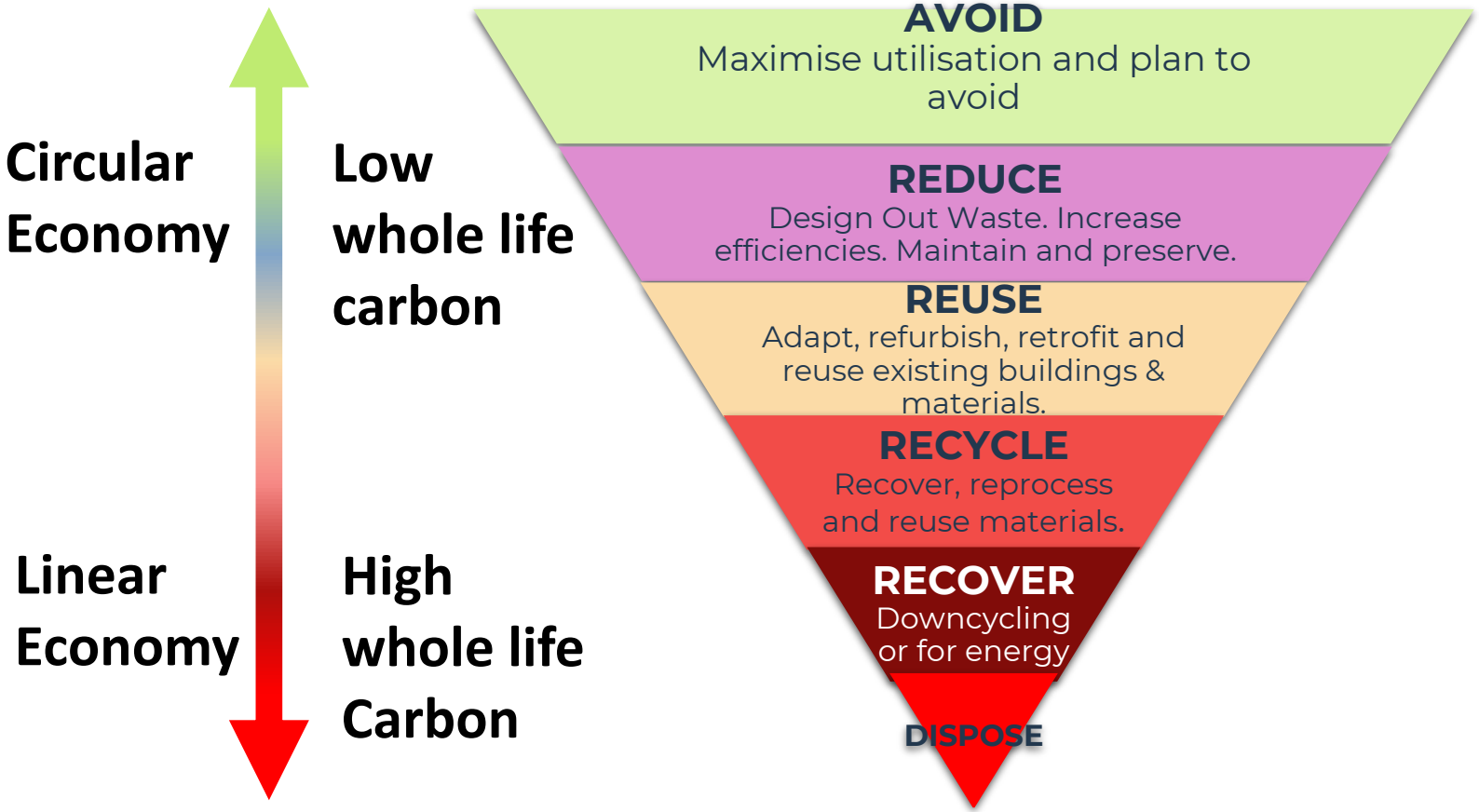
We exist to create a society where resources are valued and nothing is wasted.

Our goal is to help Scotland realise the economic, environmental and social benefits of making best use of the world's limited natural resources.

What is the ‘Circular Economy’



The Waste Hierarchy applied to the built environment



Drivers for change

Key policy drivers
- now/near future

- Net-zero by 2045 (Climate Change (Scotland) Act 2009)
- Net Zero in Public Sector Buildings Standard
- Section 7 (Sustainability) of Building Standards technical handbooks
- The London Plan, GLA – Circular Economy Statements
- Draft 4th National Planning Framework
- Circular Economy Bill (consultation)
- Extended Producer Responsibility
- Plastic Packaging Tax

Other drivers
- now/near future

- Client requirements/ask
- Public awareness and concern
  - Cost of living (energy)
  - Environmental damage
- Cost and availability of materials
  - Amplified by dependency on global supply chain
- Local jobs/economy

Plastic Packaging Tax

SOME KEY POINTS:

- A tax of £200 per tonne
- Applies since April 2022
- Applies to manufacturers and importers
- Applies to plastic packaging manufactured in or imported into the UK containing less than 30% recycled plastic
- Intended to discourage use of virgin material and help develop use of recycled content
- Expecting high annual revenues.

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Plastics production & plastics waste Polls

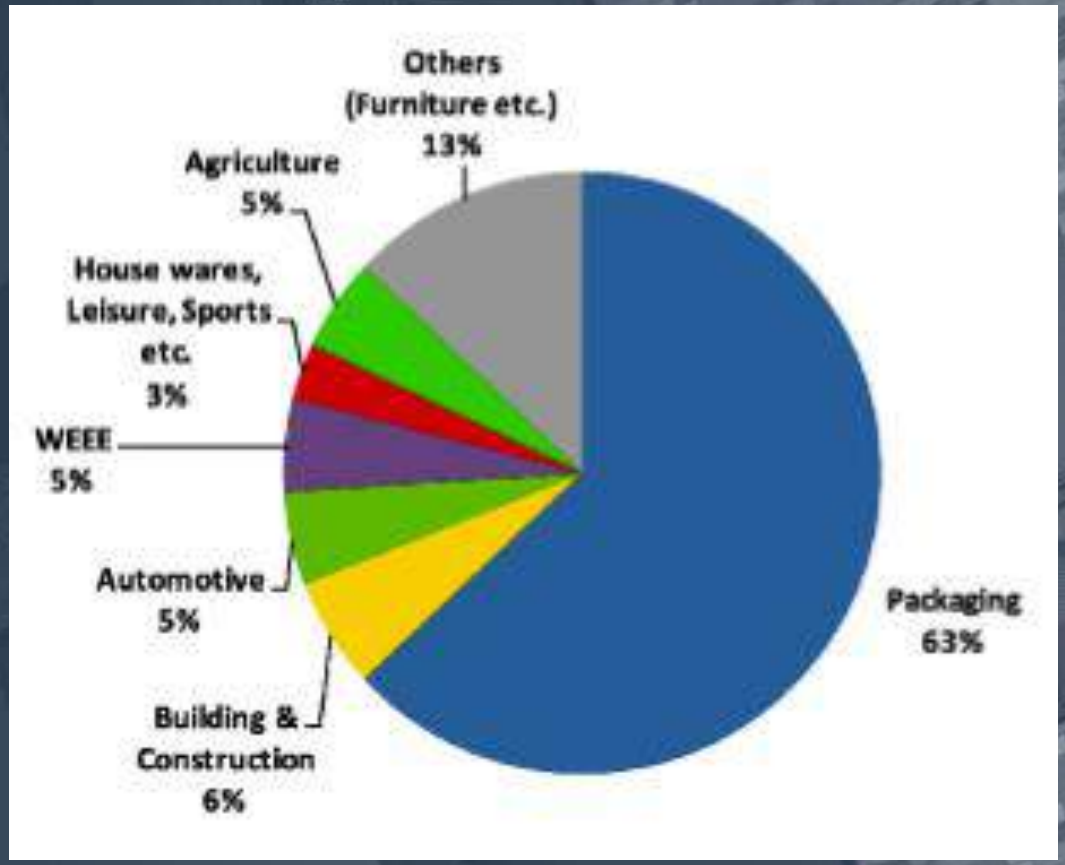
Why plastic packaging?: Sources of plastic waste

"Plastics and plastic packaging are an integral and important part of the global economy.

Plastics production has surged over the past 50 years, from 15 million tonnes in 1964 to 311 million tonnes in 2014, and is expected to double again over the next 20 years, as plastics come to serve increasingly many applications.

*Plastic packaging is and will remain the largest application; currently, packaging represents **26%** of the total volume of plastics used"*

Source: https://www.ellenmacarthurfoundation.org/assets/downloads/EllenMacArthurFoundation_TheNewPlasticsEconomy_29-1-16.pdf



Source: https://ec.europa.eu/environment/integration/research/newsalert/pdf/IR1_en.pdf

Stakeholders – who cares about the circular economy, who is interested, who has influence?

Everyone has a vested interest in achieving a circular economy… but who has the influence?

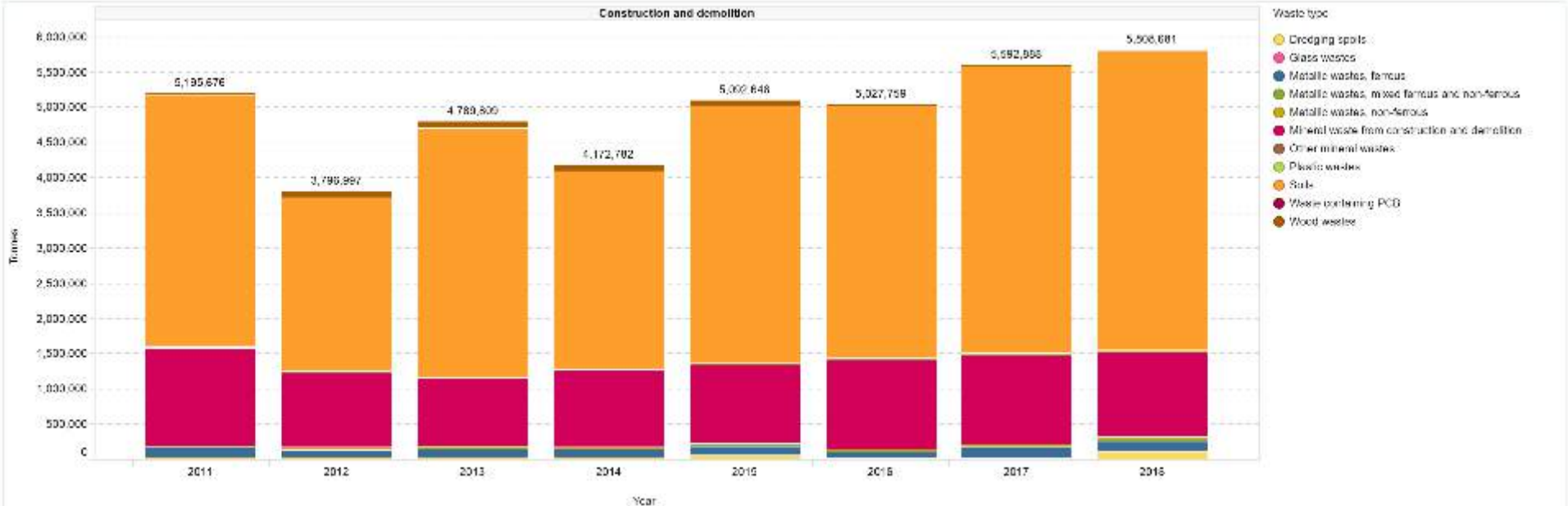
2 key stakeholders:

- Clients and the public (consumers)
- Policy makers (the Scottish Government)

Scottish Construction & Demolition Waste

Waste generation (tonnes)

	Construction and demolition							
Waste type	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Dredging spoils	9,481	7,456	9,961	8,454	40,220	1,855	5,442	94,925
Glass wastes	5,829	4,199	2,579	2,743	2,915	3,798	1,427	378
Metallic wastes, ferrous	137,053	107,193	123,595	113,947	124,271	91,846	145,223	149,731
Metallic wastes, mixed ferrous...	15,109	22,321	24,958	24,620	30,733	18,363	37,710	38,094
Metallic wastes, non-ferrous	10,517	13,040	15,176	11,605	12,547	12,031	16,940	16,969
Mineral waste from constructi...	1,391,170	1,058,884	952,781	1,086,622	1,110,605	1,263,720	1,251,973	1,201,295
Other mineral wastes	20,551	16,147	10,512	17,698	22,795	23,520	24,642	23,784
Plastic wastes	492	3,018	1,785	1,274	1,303	1,717	4,324	5,902
Soils	3,567,377	2,469,753	3,547,340	2,807,613	3,665,860	3,602,982	4,074,366	4,248,335
Waste containing PCB	3,604	249	6					
Wood wastes	34,492	94,739	101,116	98,206	81,397	7,928	30,841	29,268



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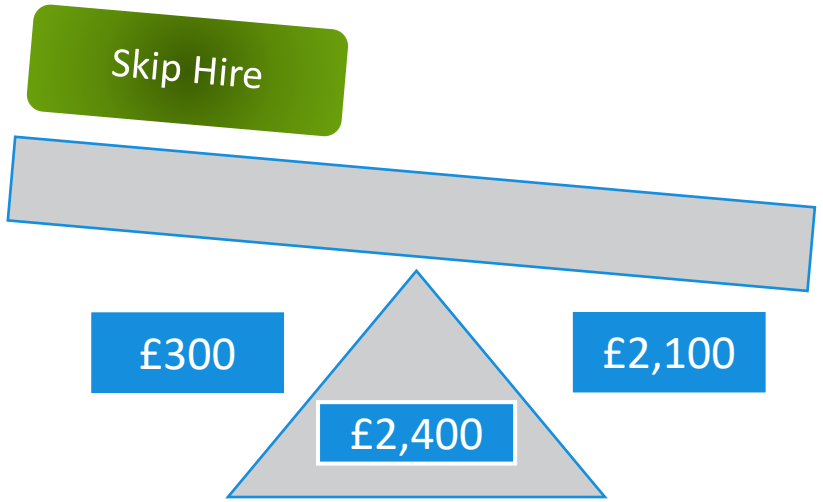
Driving Down Waste Poll

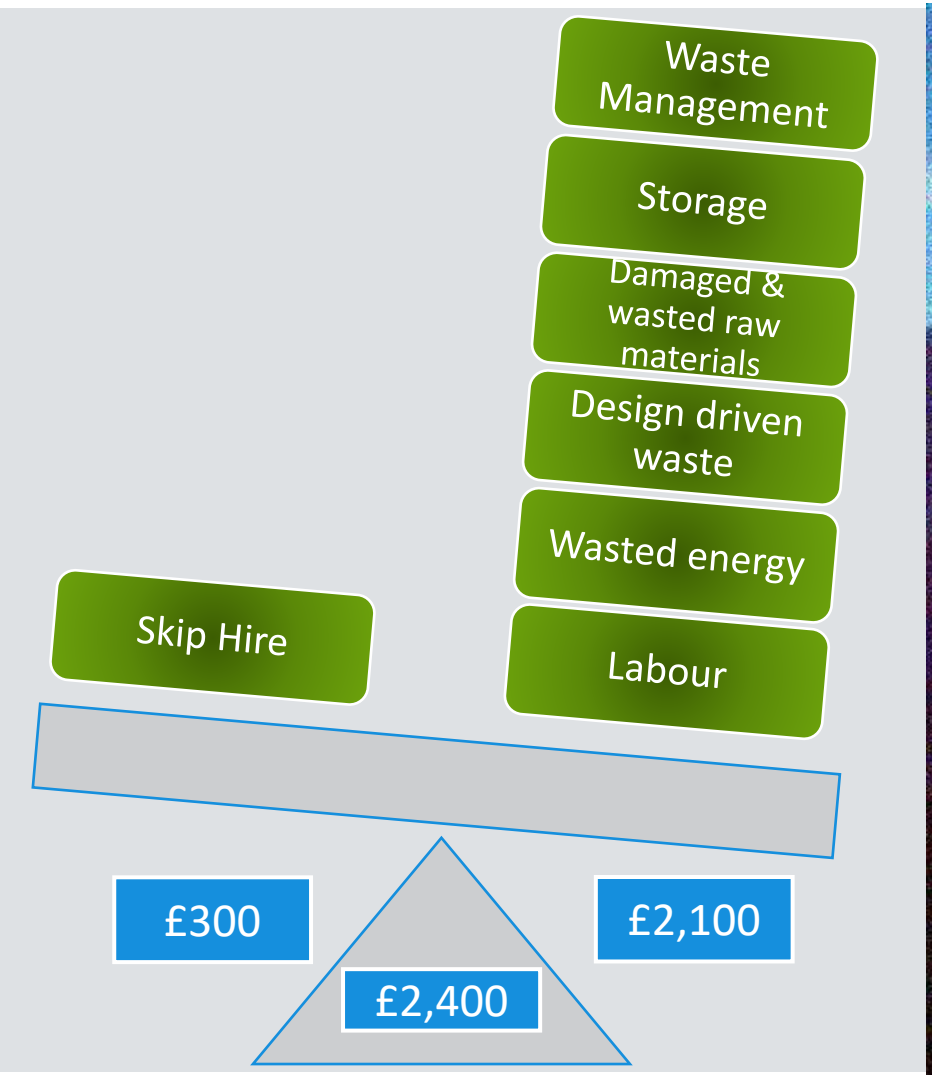
True Cost of Waste

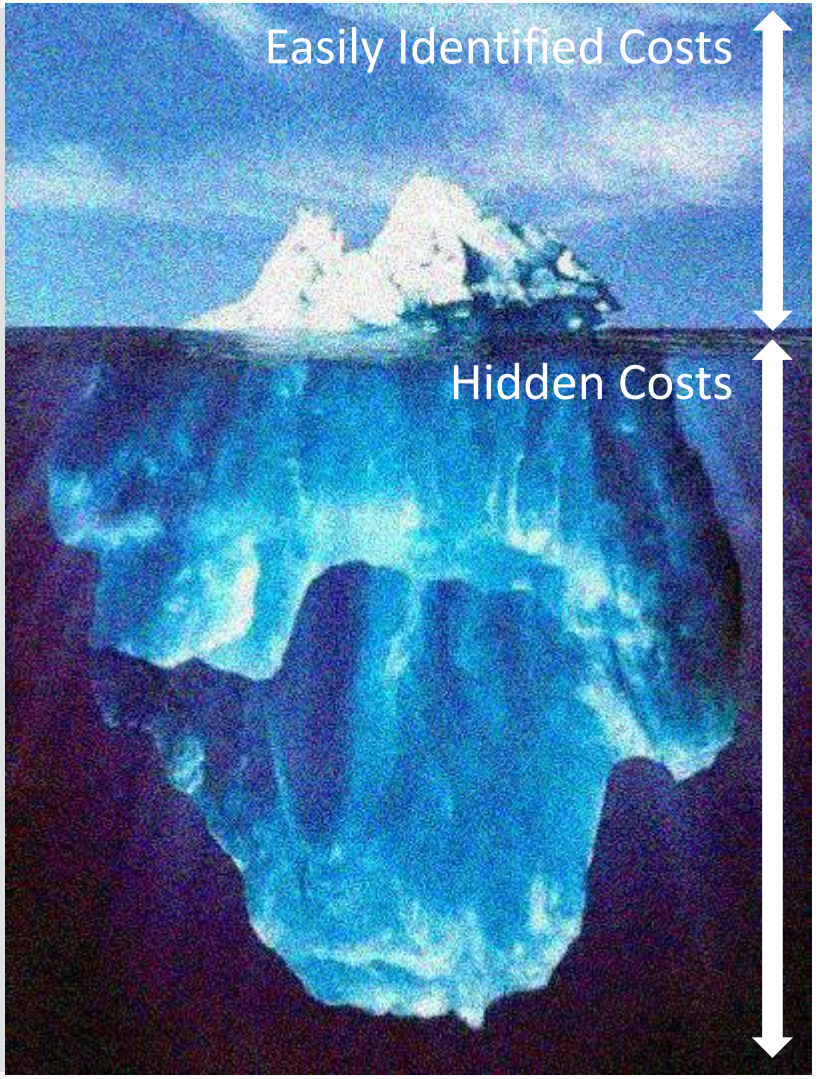


Question – put your answers on the Jamboard

What are the other contributing factors to the true cost of waste? – name up to three

True Cost of Waste





Causes of construction (materials) waste

Client and Design Influence

- Ignoring buildability
- Materials of unsuitable dimensions (standard sizes)
- Client/designer change of mind
- Specification failing to match quality of building required
- Resistance to adopt alternative materials

Delivery of Products

- Over-ordering
- Method of packaging
- Method of transport
- Inadequate data re: time/method of delivery
- Inadequate details re: performance/ quality/site facilities

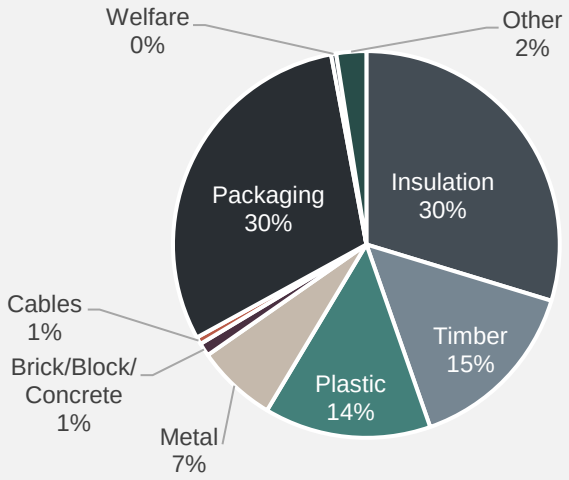
Site Management and Practices

- Poor management system: stock control/organisation/supervision
- Untidy construction sites
- Poor storage/handling e.g. breakage, damage, losses
- Excess materials at workplace/ over-sized foundations and other elements
- Undue cutting, fixing, application and residue waste
- Inadequate protection to finished work (other trades/vandalism)
- Learning curve/lack of training

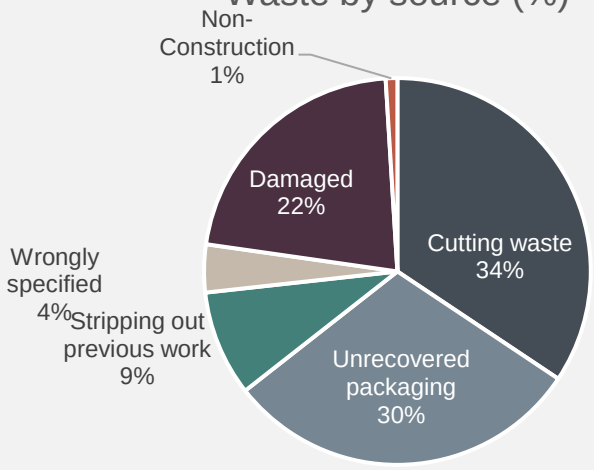
Site Waste Reduction Protocol

4.55 cubic meters of materials	£1,250.72
Labour	£11.08
Cost of damages and errors	£823.43
Equipment (telehandler fuel)*	£0.20
Skip Hire (8 yard mixed waste)*	£207.00
VAT (0% Labour & Building Materials; Other Costs* 20%)	£103.40
TOTAL	**£2,395.83**

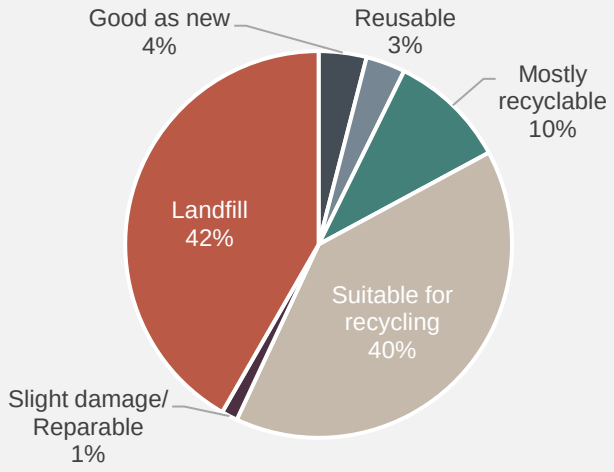
Waste by volume (%)



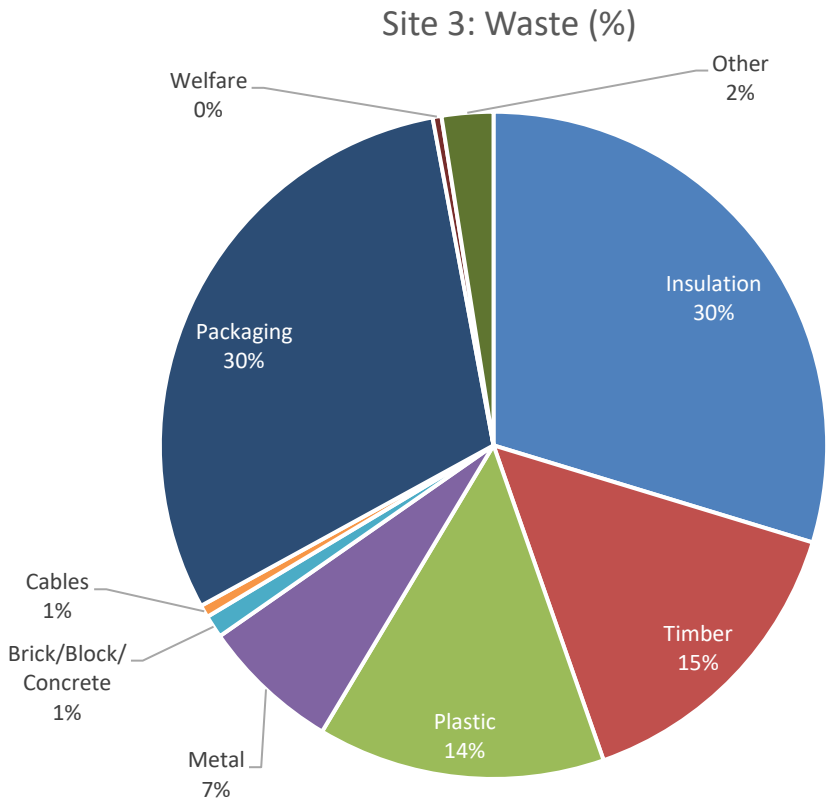
Waste by source (%)

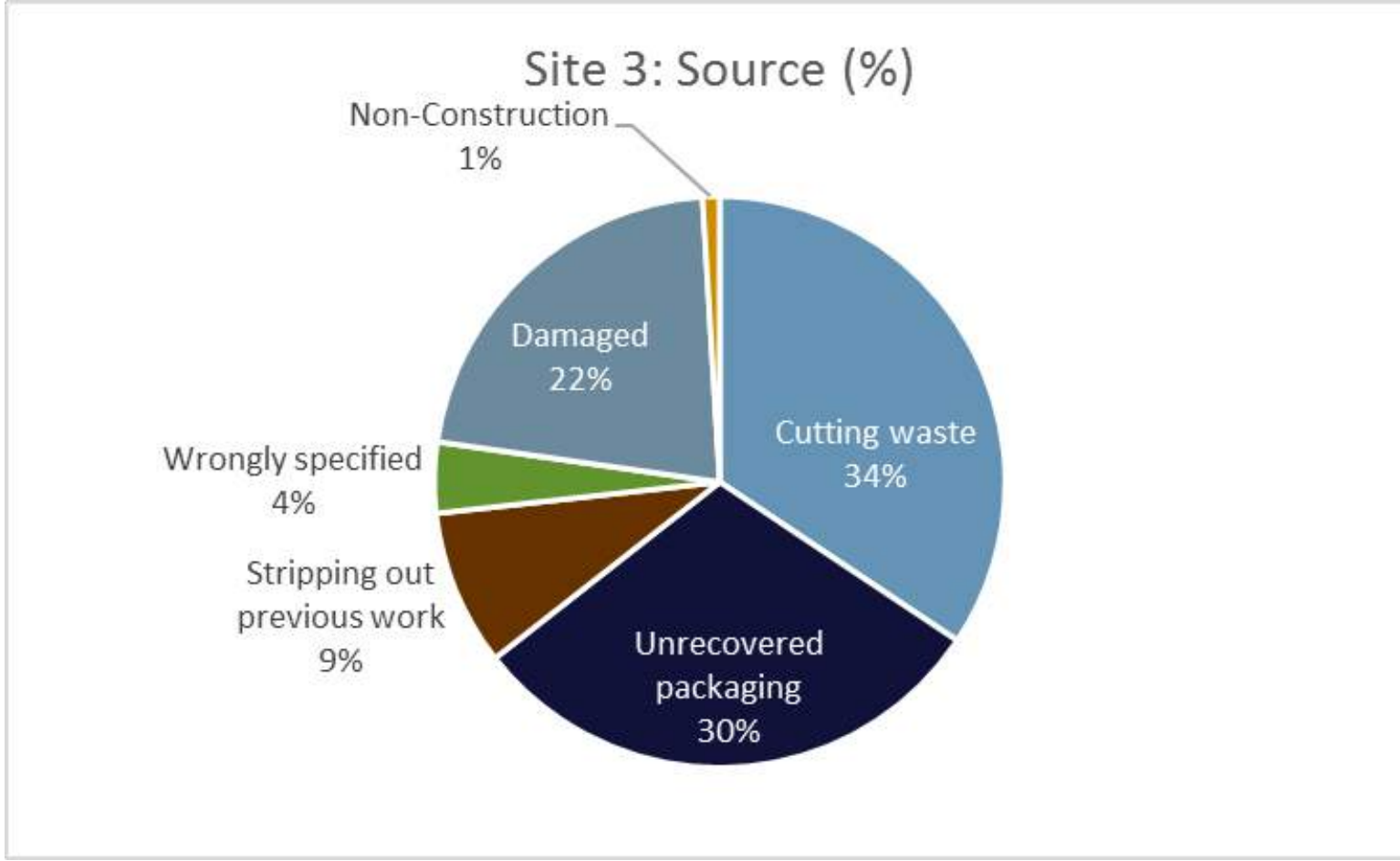


Condition of waste (%)

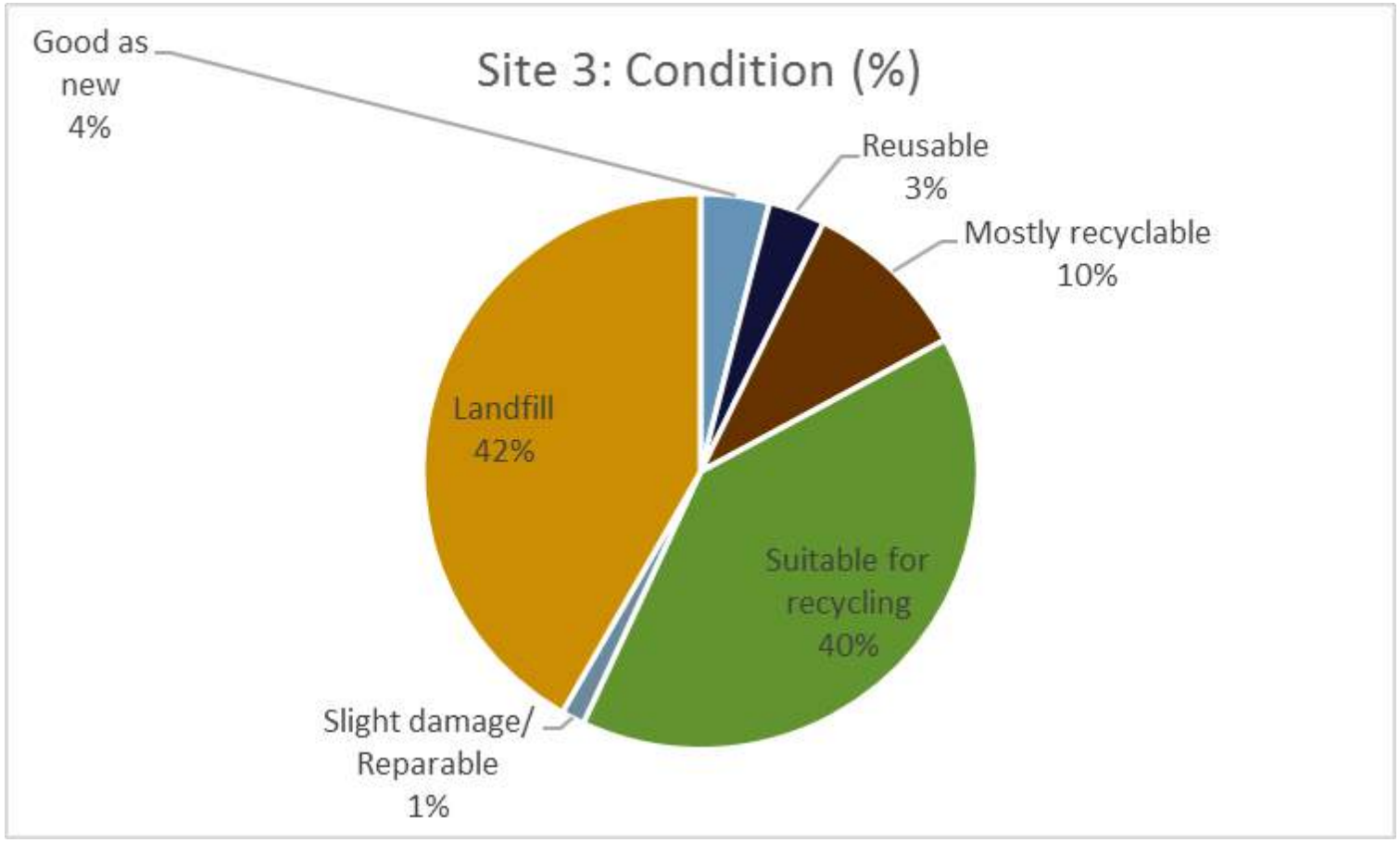


Waste by percentage of volume
Source: Zero Waste Scotland – standard housing project example

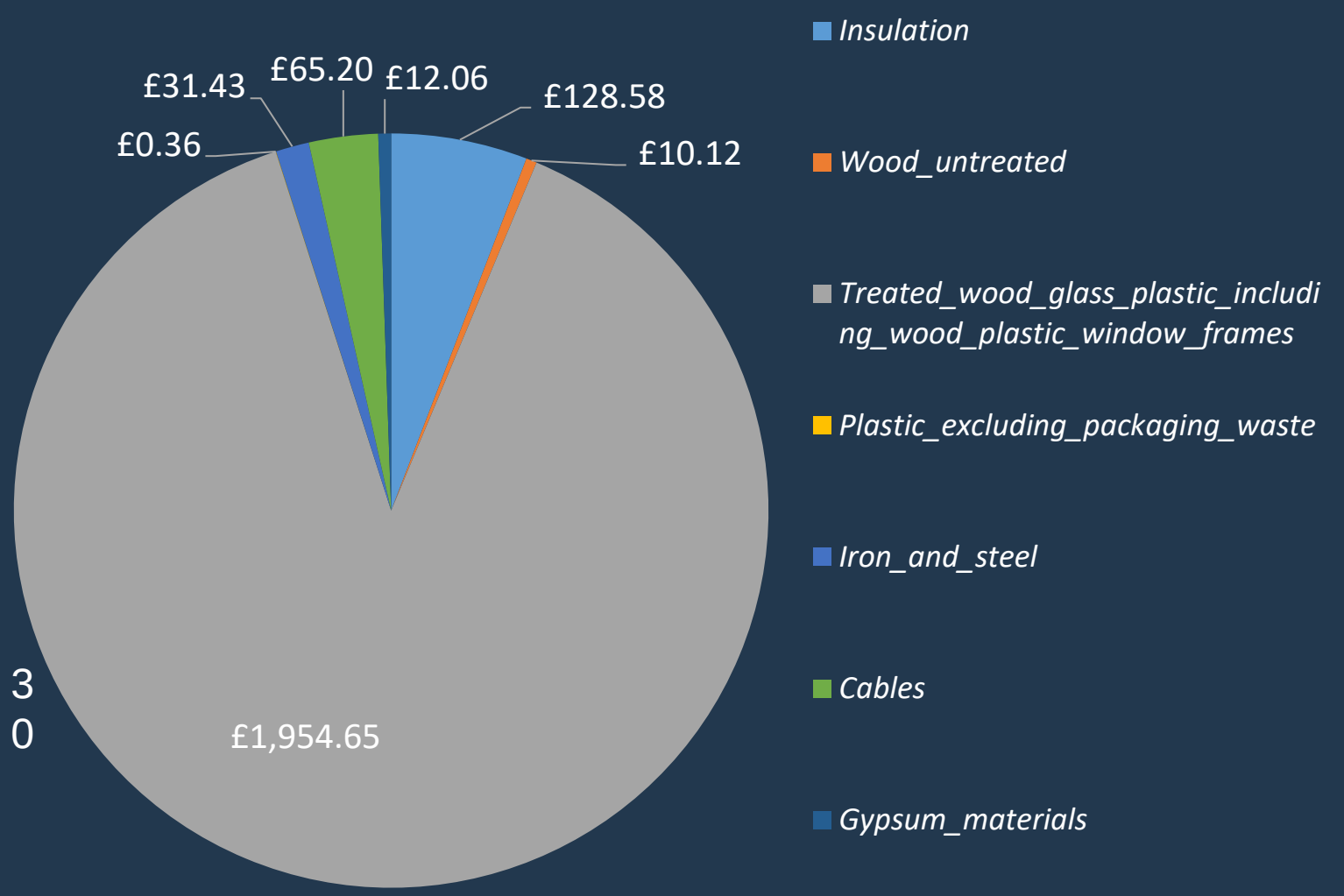




Condition of the Waste



Cost (8 Yard Equivalent): Site 1 – Higher Education Build



- **1/3 of products discarded were in a usable condition**
- **80% of waste was from cutting standardised materials to fit**
- **The largest waste streams by volume products didn't drive the costs**


Circular economy is a systematic response that addresses a design problem NOT a waste problem

What is the Circularity Gap Report?

- Understand our ‘resource reality’
- Empower decision-makers to accelerate the circular transition

Principles for design approach

‘Adopting a design approach that focuses on materials resource efficiency so that less material is used in the design (i.e. lean design), and/or less waste is produced in the construction process, without compromising the design concept.’

Design Out Waste Guide, Zero Waste Scotland

Core designing out waste principles

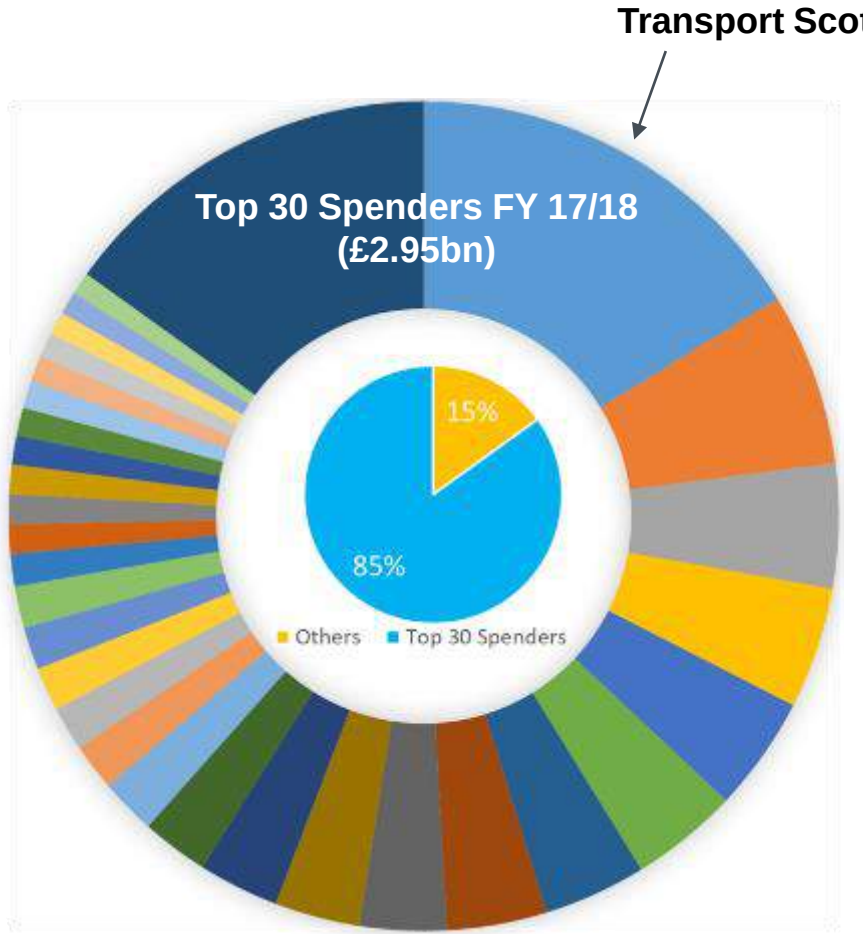
Design for:

1. Resource-efficient procurement
2. Materials optimisation
3. Off-site construction
4. Re-use and recovery
5. Deconstruction and flexibility

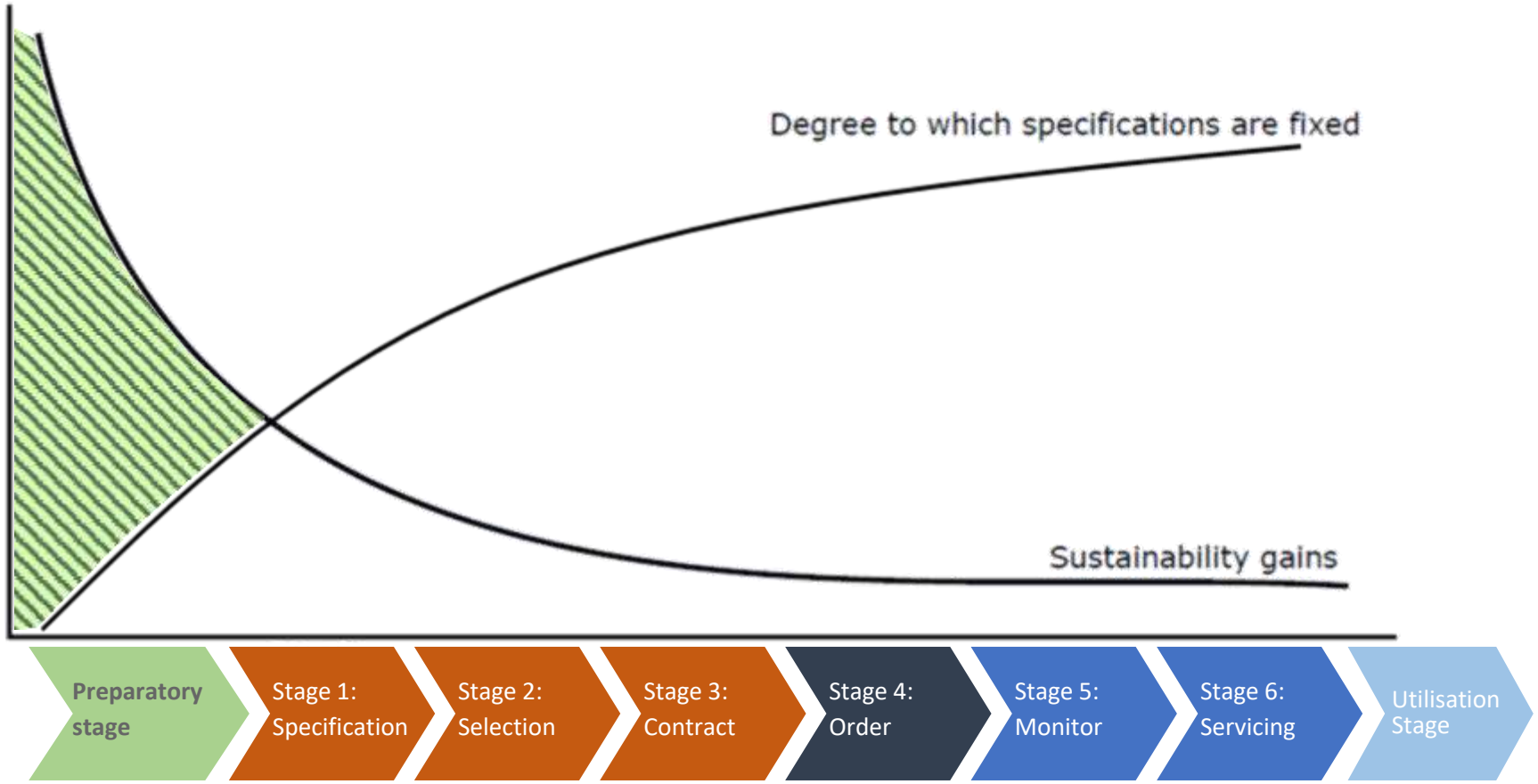
SOURCE:
https://www.zerowastescotland.org.uk/sites/default/files/Designing%20Out%20Construction%20Waste%20Guide_0.pdf

Design for resource-efficient procurement

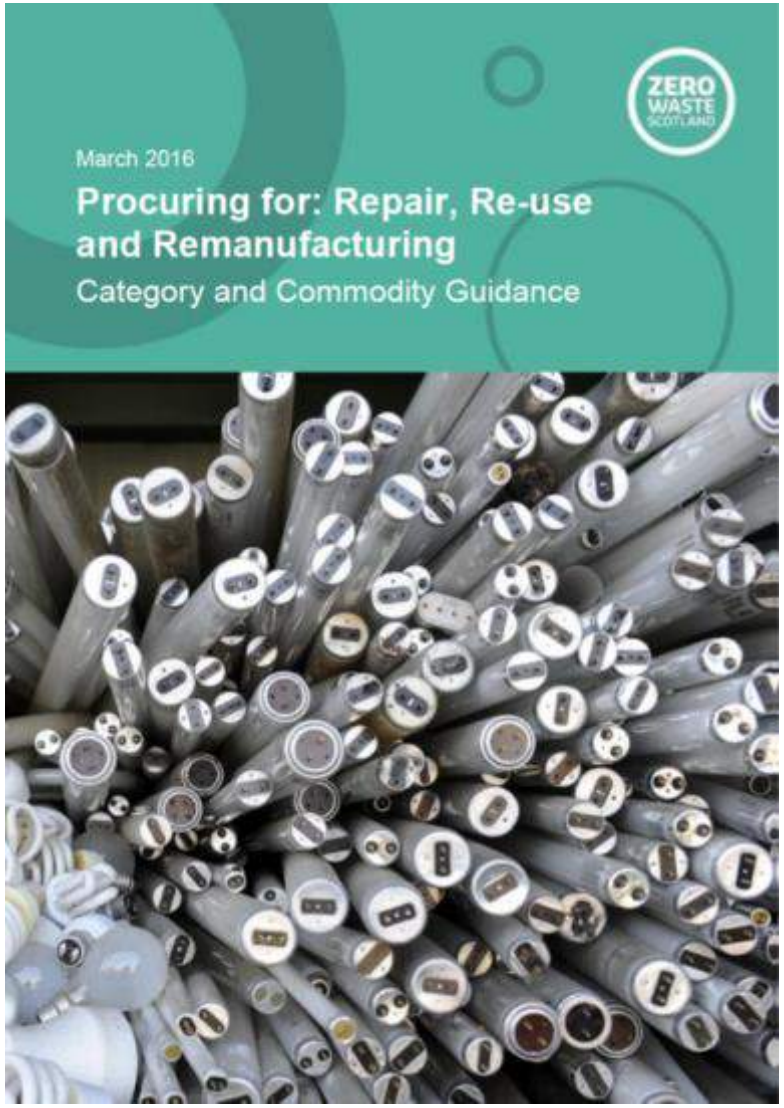
- What research can be carried out by the design team to identify where onsite waste arises?
- What construction practices and plant can be used to reduce emissions, energy, water use and waste on site?
- Which specialist contractors can be consulted during the design process to contribute ideas from their experience?
- Which specifications should be reviewed to ensure elements / components / materials are selected which contribute to the project's resource efficiency objectives?
- Does the programme allow time for the incorporation of designing out waste measures to be adopted?



Pre-procurement planning = biggest impact



Embedding Circular Economy within procurement



Early consideration

- Link Circular Economy to Corporate Plan objectives.
- Extensive engagement – internal & external
- Life-cycle costing and impact

Specification

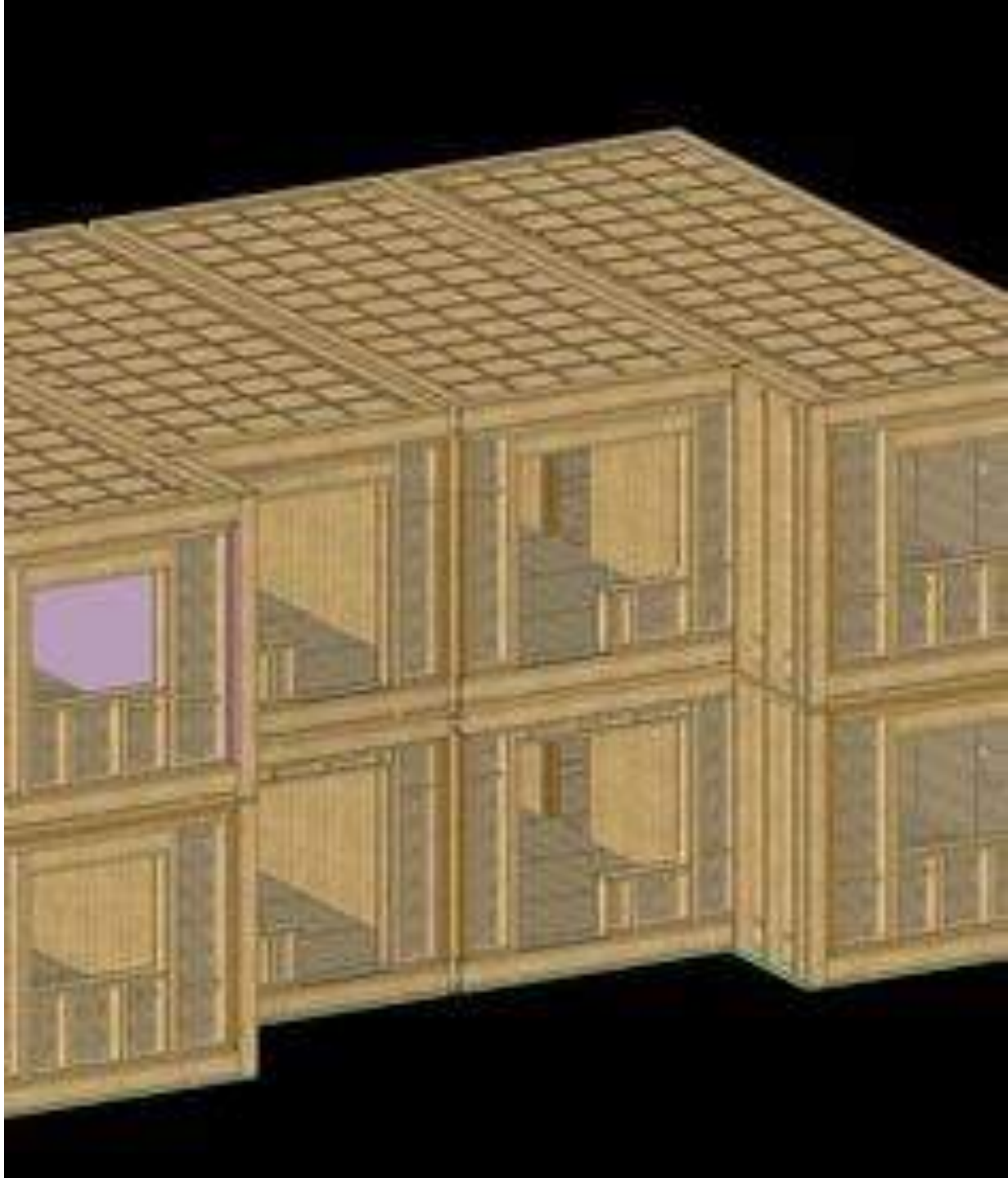
- Performance/Outcome based specification

Contract Management

- Capture impact & reporting of benefits

Design for resource efficient procurement

- Can the design, form and layout be simplified without compromising the design concept?
- Can the design be coordinated to avoid/minimise excess cutting and jointing of materials that generate waste?
- Is the building designed to standard material dimensions?
- Can the range of materials required be standardised to encourage reuse of offcuts?
- Is there repetition & coordination of the design, to reduce the number of variables and allow for operational refinement (e.g. reusing formwork)?



Triodos’ new headquarters: wooden "cathedral” re-constructible office building.

Cairngorms National Park Authority HQ designed by Moxon architects using BIM to maximise resource efficiency and minimise waste.

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Circularity in Procurement Poll

Design for off-site construction

- Which parts of the design can be manufactured off site but locally?

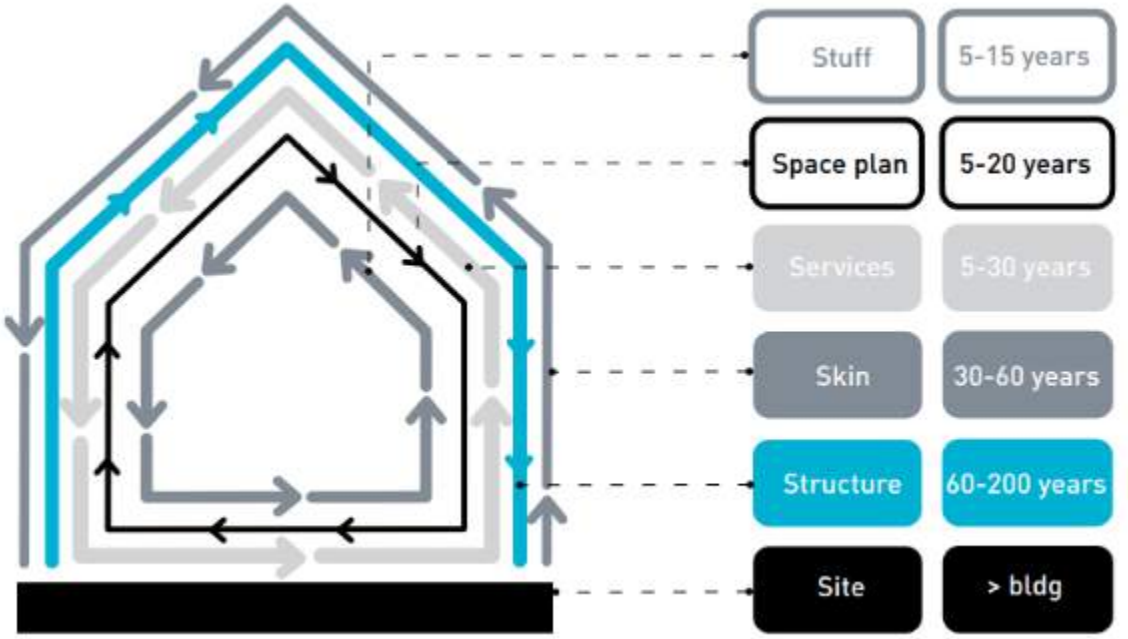
- How can site activities become a process of assembly rather than construction?

The Resource Efficient House, Ravenscraig – a modular building that was constructed offsite, used recycled materials and is deconstructable.

Design for re-use and recovery

Think about:

- The different layers of a build
- The accessibility and repairability of the components and materials
- The use of durable materials and products
- The use of standardised components
- The use of standardised tools
- The use of mechanical fixings and reduction of chemical bonding



Sketch: John Gilbert Architects based on 'How Buildings Learn', Brand (Viking, London 1994)

Source: John Gilbert Architects

The Queens Park London Olympic Stadium used surplus gas pipeline for the structure and 104,000 tonnes of recycled crushed concrete for a temporary platform.

The entire project was conceived with legacy in mind.

Bute Recycling Centre, Rothesay, Isle of Bute, designed by Collective Architecture and constructed with the principles of sustainability at its core, to reduce waste generated during the construction processes through attention to material management.

RAU ARCHITECTS – LIANDER OFFICE

The building is energy positive, and 80% of the materials present are reused. Natural biophilic materials used to create a health productive office.

Reuse of a building (conservation) is a good example of circularity.

The Engine Shed, designed by Reiach & Hall is Scotland's building conservation centre, created and managed by Historic Environment Scotland with collaboration with multiple stakeholders in 2017.

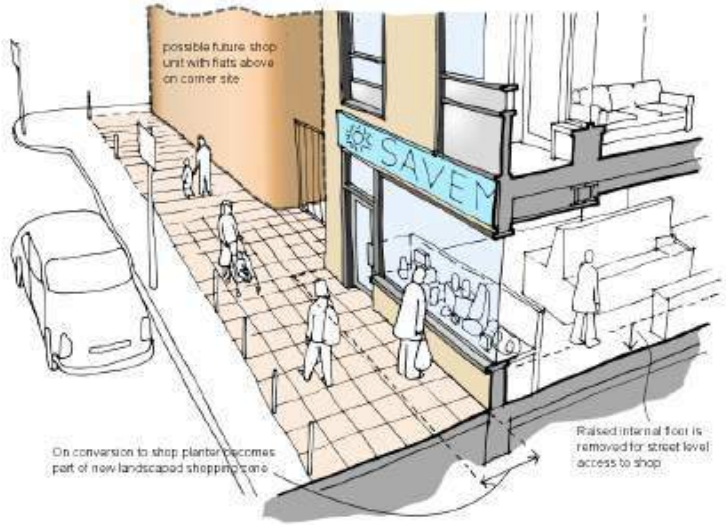
Design for deconstruction and flexibility

- Is the design adaptable for a variety of purposes during its life span?
- Can building elements and components be maintained, upgraded or replaced without creating waste?
- Does the design incorporate reusable/recyclable components and materials?
- Are the building elements/components/materials easily disassembled?
- Can a Building Information Modelling (BIM) system or building handbook be used to record which and how elements/components/materials have been designed for disassembly?

Building D(emountable) is a modern, sustainable and fully demountable structure in the center of Dutch city Delft.

“An adaptive building has to allow slippage between the differently-paced systems of Site, Structure, Skin, Services, Space Plan, and Stuff. Otherwise the slow systems block the flow of the quick ones, and the quick ones tear up the slow ones with their constant change.”

Brand, 1994



Courtesy John Gilbert Architects

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Pillars of Circular Construction Poll

Designing out Waste process

- **Identify** opportunities to Design out Waste
- **Prioritise** those with biggest impact and easiest to implement
- **Investigate** their viability
- **Quantify** the benefits

- **Embed** in the design
- **Record** decisions made
- **Communicate** to the client / contractor

EXERCISE: Implementing the five key principles

Principle	Already doing? – Please describe What's working? Challenges?	Planning to do? Opportunities? Challenges?
1. Resource-efficient procurement		
2. Materials optimisation		
3. Off-site construction		
4. Re-use and recovery		
5. Deconstruction		

Examples of supplier approaches to circularity

Circular Case Study:

‘Upcycling’ Cheshire Police HQ

Whitecroft lighting

2,000Kg Raw Material Saved

23W energy saved per fitting

1.5 tonnes packaging reduction

£30 Cheaper to re-use

A New Circular Business Model

Whitecroft Vitality

- Circular Design and Manufacture
- Highest Through Life Utility
- Regeneration and Recovery

Our world is changing…

Climate

Earth's average **temperature** has increased by 1C° since 1900. In 2050, global temperature is set to **increase by 2C°.**

Resources

Earth overshoot day fell on July 29th in 2021. In less than eight months, humanity has exhausted Earth's budget for the year.

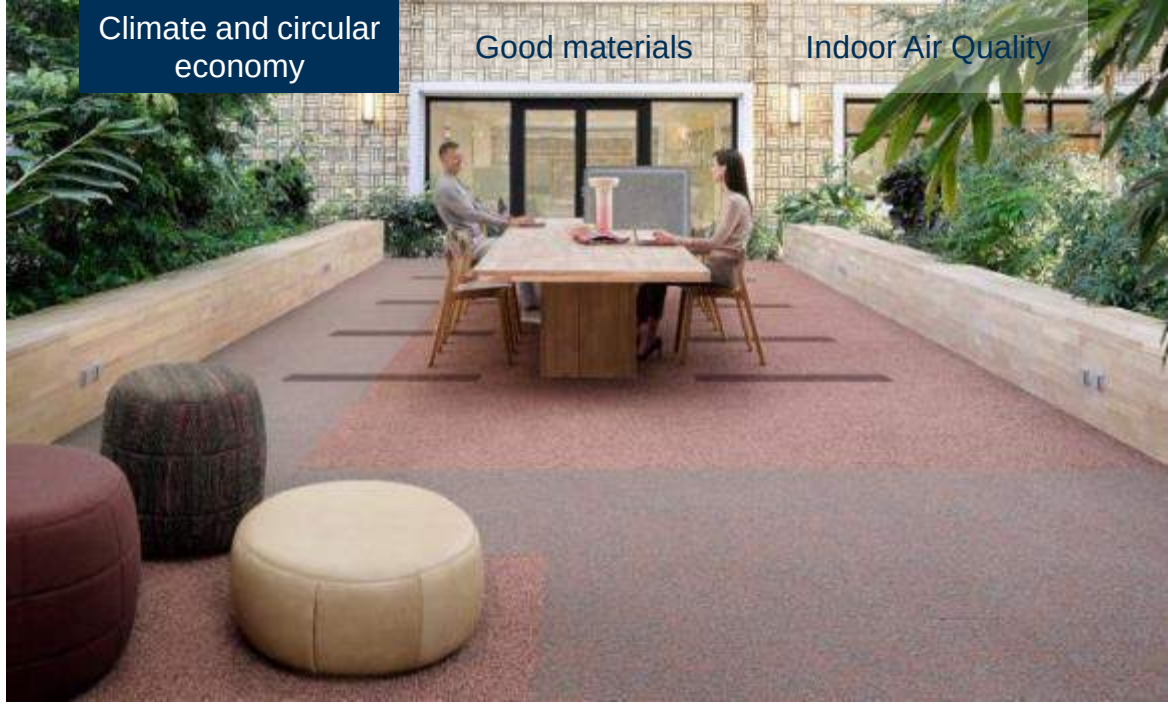
Health

We spend **90% of our time** indoors and indoor air is **2 to 5 times** more contaminated so clear air and healthy spaces matter.

…Making conscious choices, has never been more important

Circular Selection

Climate and circular economy | Good materials | Indoor Air Quality



Looking for circular products?

We've made sustainable flooring easy for you by bringing together our post-use recyclable products in one collection.

Recyclable post-use

- there is a functional system to collect installation waste and post-use waste,
- the waste is transported to a facility where the material is recycled into new raw materials or products.

Phthalate free

Today, all our European vinyl collections are phthalate free.

Good for people and planet.

We're investigating the health, safety and environmental credentials of our materials.

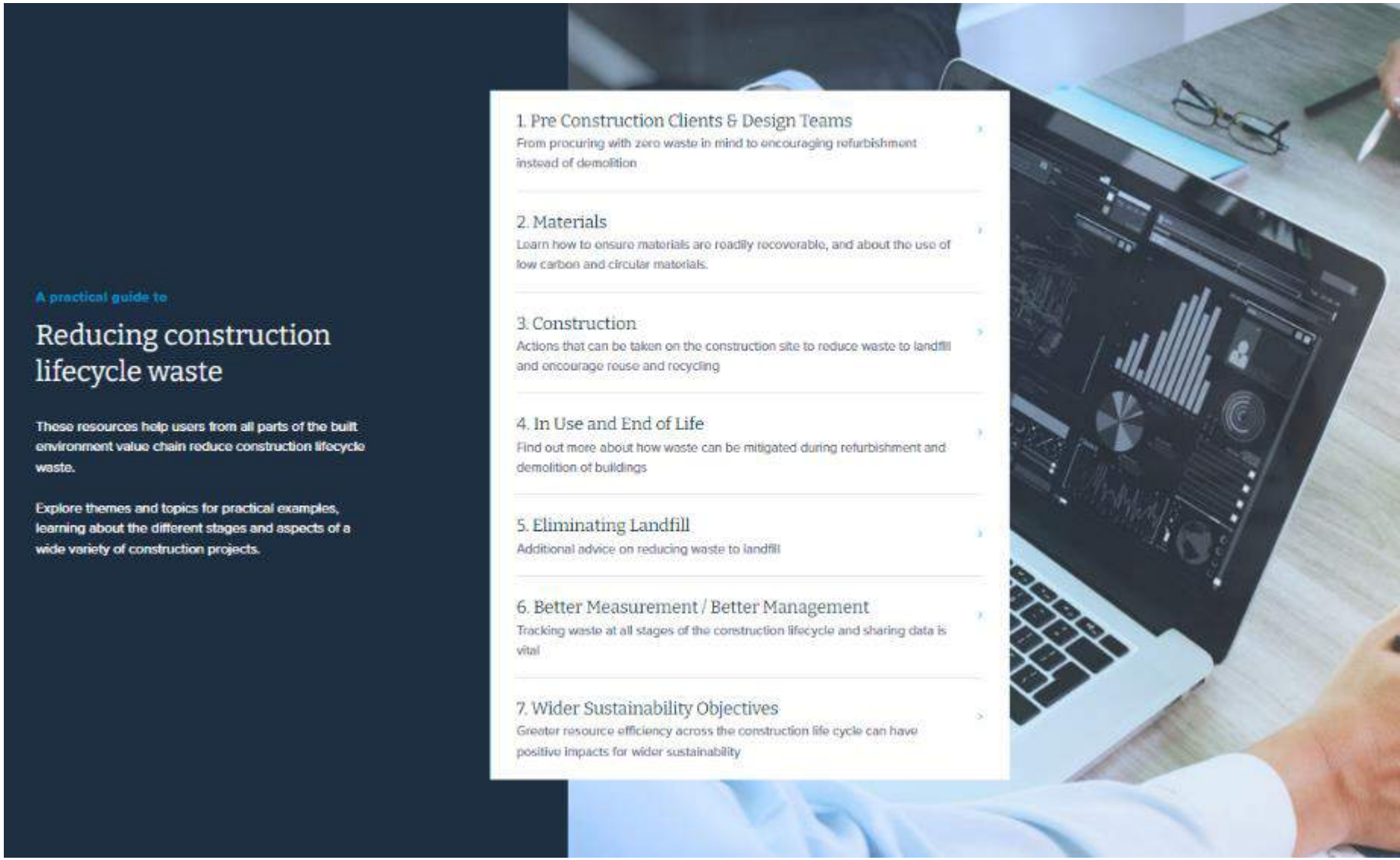
Green building certifications

Helping you hit your sustainability targets and achieve green building certifications.

Our high levels of recycled content, take-back and recycling initiatives through ReStart®, low VOC emissions and product certifications along with our use of a phthalate-free plasticiser since 2011, can help you achieve higher standards of sustainability and reach green building labels like LEED, WELL and BREEAM.

The School has developed new pages containing practical advice and examples based on this model –

We would love to include your own content in the form of case studies etc.



Guidance and tools

- Free to access resources available - https://zerowastescotland.org.uk/our-work/circular-construction
- Free tools and guides:
  - Designing out Waste guide
  - Site Waste Management tool
  - Guide for construction waste management
  - Maximising re-use of materials on-site
  - Procurement guide

  - Construction resource library - https://www.zerowastescotland.org.uk/content/construction-resource-library

The Green Construction Board

Construction Leadership Council

The Routemap for Zero Avoidable Waste in Construction

Introduction

Waste costs the construction industry an estimated £11 billion per annum and emits 3.5 million tonnes of CO_2e, yet waste can be reduced, materials used more efficiently, and buildings and structures at end of life repurposed, refurbished or dismantled to enable products and materials to be a resource for new activities.

This Routemap aims to catalyse actions by all parts of the supply chain to reduce and ultimately eliminate all avoidable waste. It adopts the interpretation of Zero Avoidable Waste in construction published by the Green Construction Board (GCB) in 2020 and adopts the principles of the waste hierarchy and life cycle assessment.

The Routemap is an interactive infographic identifying aims, actions, context and guidance. Click on an Aims button and a new page appears. Hover over Context and an explanation appears. Click Guidance and a new page links to published guidance.

It has been prepared by the GCB's Resources and Waste Task Group with the principal authors being Katherine Adams, Rob Pearce and Jane Thornback. The project received financial support from BEIS, and was in collaboration with Defra.

Click for Context

Targets and Guiding Principles

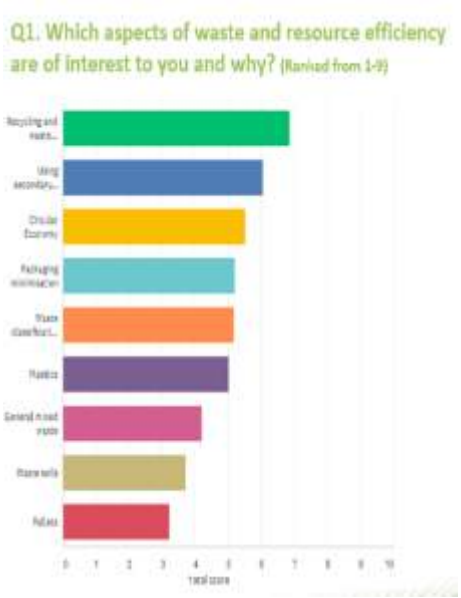
Click for Acknowledgements

GB705 | Version 1.0 | June 2021

The School's Waste & Resource Use Category Group

Refreshed
-Landing page
-Resources (new and old)

Material Exchange Platforms Mapping
- Skanska collaboration



Surveys
-Member interest
- Partner plastic waste

Partner case studies

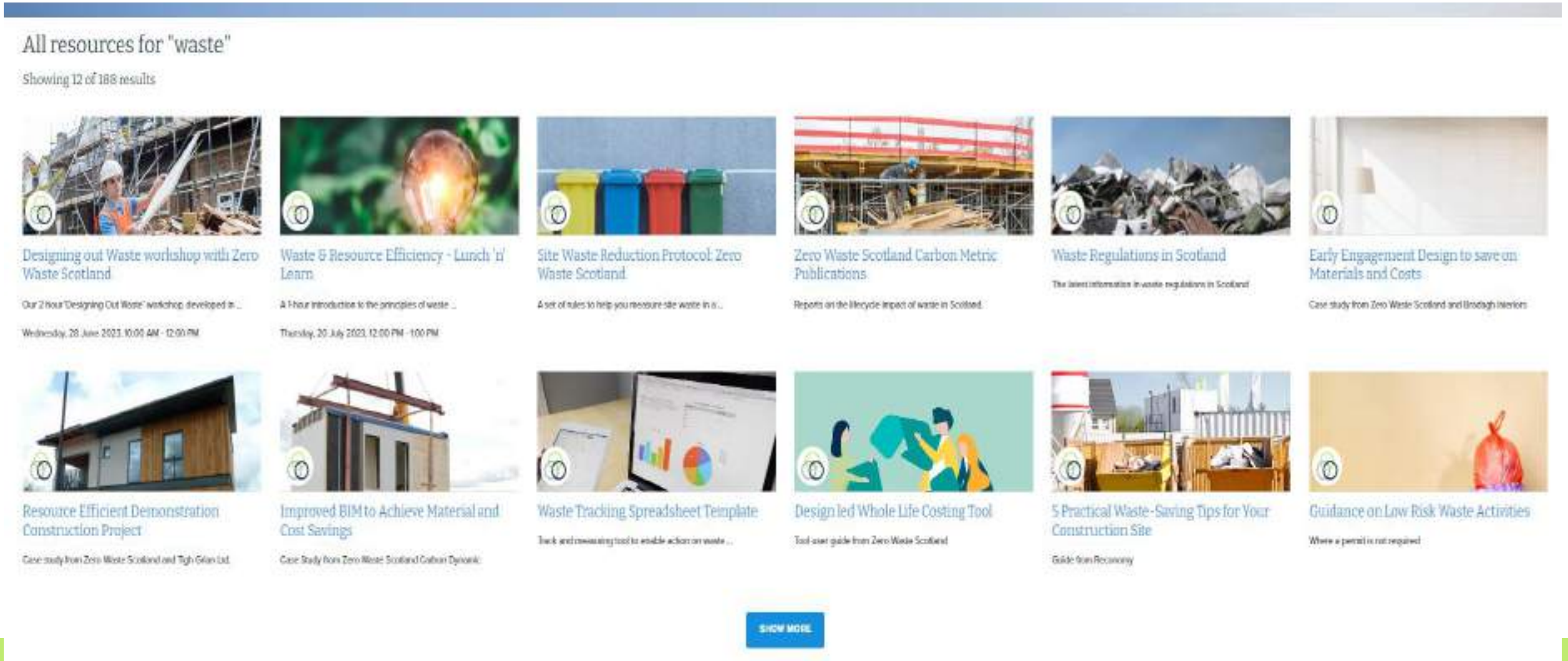
Leadership group support

Items currently on our hitlist

Informing School on policy and legislative changes	Plastic Packaging Tax, Circular Economy, Producer Responsibility etc
Designing out waste	Guidance and events, promoting circularity
Packaging projects	Guidance, events, collaboration, research – Infra/Fit Out/M&E?
Construction project lifecycle waste	Developing resources to improve outcomes
Supporting procurement processes	Developing model tender questions and responses
Soils and aggregates	Improving understanding and performance
Plastics and aggregate reprocessing companies	Mapping and developing knowledge on how to engage
Collaboration with other groups	Addressing SDGs, working with Carbon Group on scope 3 etc
Social value	Research and collaboration opportunities

Further learning

Training and Awareness – loads of content in the School library



Material Exchange Platform Mapping

How?

Use the map to find out the locations of MEPs in the UK and to find out more information on exchanging material. You may have surplus stock from a recently finished project, or are looking for second hand upcycled furniture; these are some examples of how you might use MEPs.

Where?

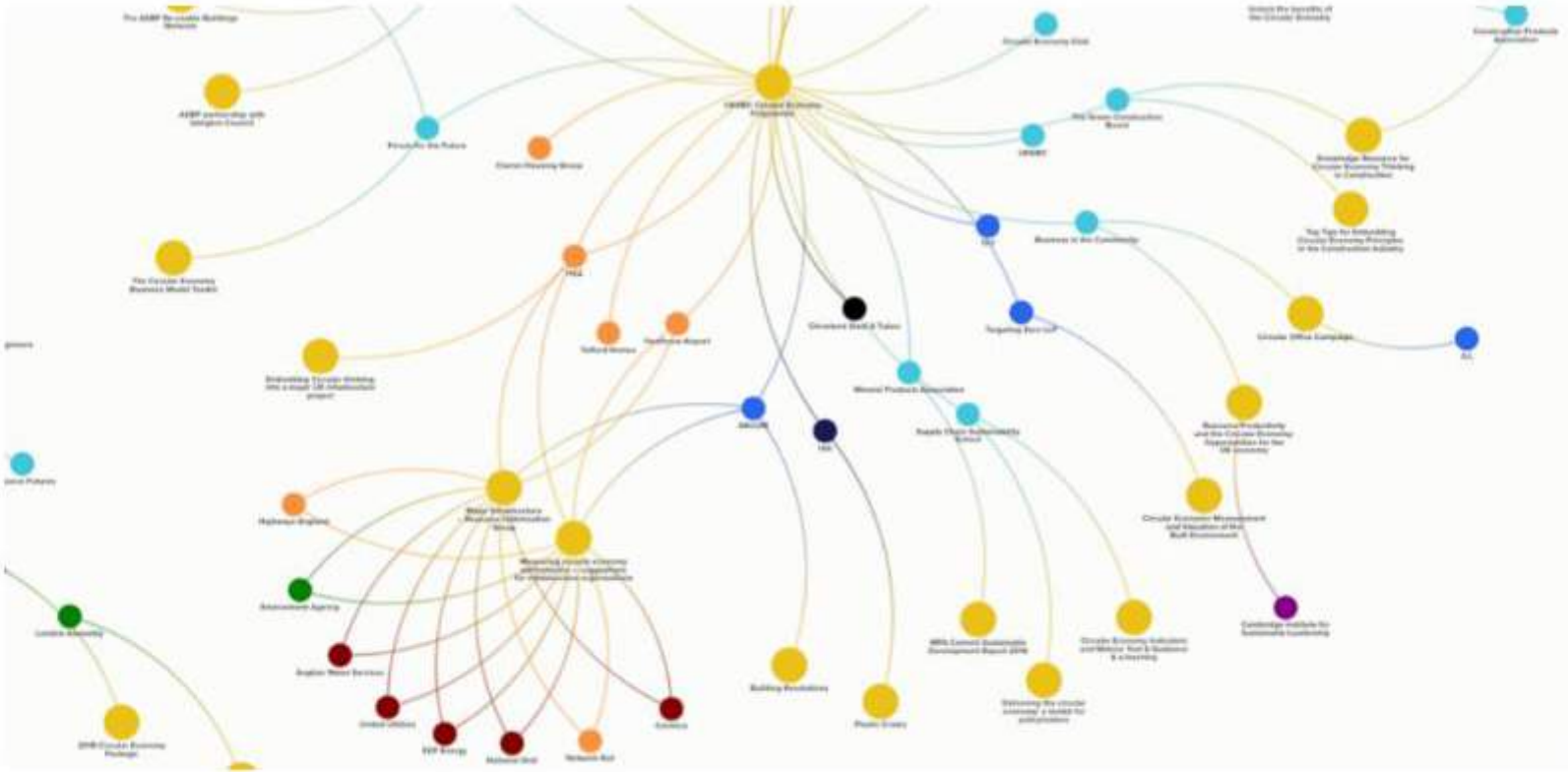
View the map >

Also accessed via:

1. https://maps.supplychainschool.co.uk/
2. Waste and Resource Efficiency Group page here

If you are aware of any MEPs that are should be added or deleted from the map, or information that should be revised, please complete this form and send to Imogen@supplychainschool.co.uk

Circular economy actor and resource map



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Source: https://www.ukgbc.org/ukgbc-work/circular-economy-actor-and-resource-map/

Thank you

Any questions?

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We need your feedback please

This link will be posted in the chat:

LINK: https://forms.office.com/e/sNHfVxxNNH

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