

Building Transport Networks for the Future: A Circular Economy Perspective

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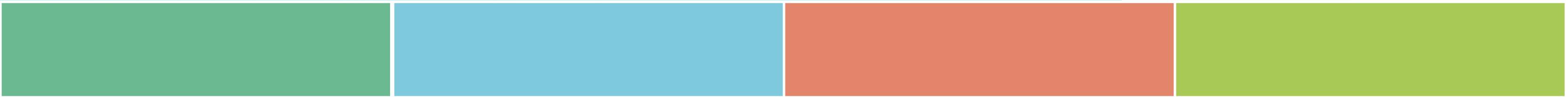


Building Transport Networks for the Future: A Circular Economy Perspective

Our planet is running out of natural resources.

The equivalent of almost three planets will be required by 2050 to sustain current lifestyles.

Yet we still need to provide infrastructure.



Building Transport Networks for the Future: A Circular Economy Perspective

What shall we do?

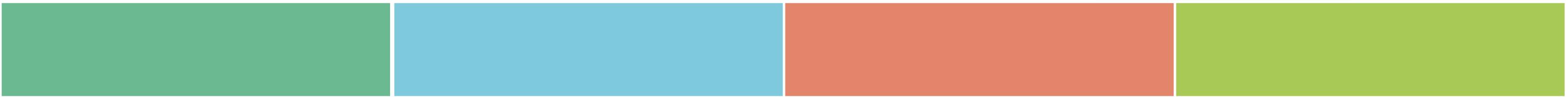
Continue to provide infrastructure.

Build on what we already do.

Generate opportunities for innovation.

Tackle barriers to existing processes.

Introduction to Circular Economy



Practical Application



An Roinn Iompair
Department of Transport

Project Ireland 2040

National Investment Framework for Transport in Ireland

TII is working to adopt a circular economy approach in the activities, programmes and projects it delivers and funds.

Procurement will need to include circular economy requirements



Construction & Commissioning Standards



TII standards will embed CE principles to enable circular economies

Government Policy

Reports and Publications

Dec 2019



EU Sustainability Strategy

March 2020



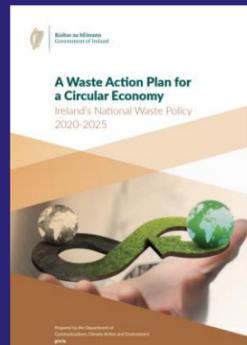
EU Circular Economy Action Plan

June 2020



Programme for Government

Sept 2020



Waste Action Plan for a Circular Economy

Oct 2021



National Development Plan 2021-2030

Dec 2021



Whole of Government Circular Economy Strategy 2022-2023



National Investment Framework for Transport in Ireland (NIFTI)

April 2022



OECD Report The Circular Economy in Ireland

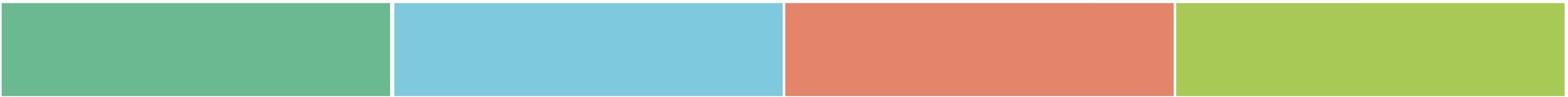
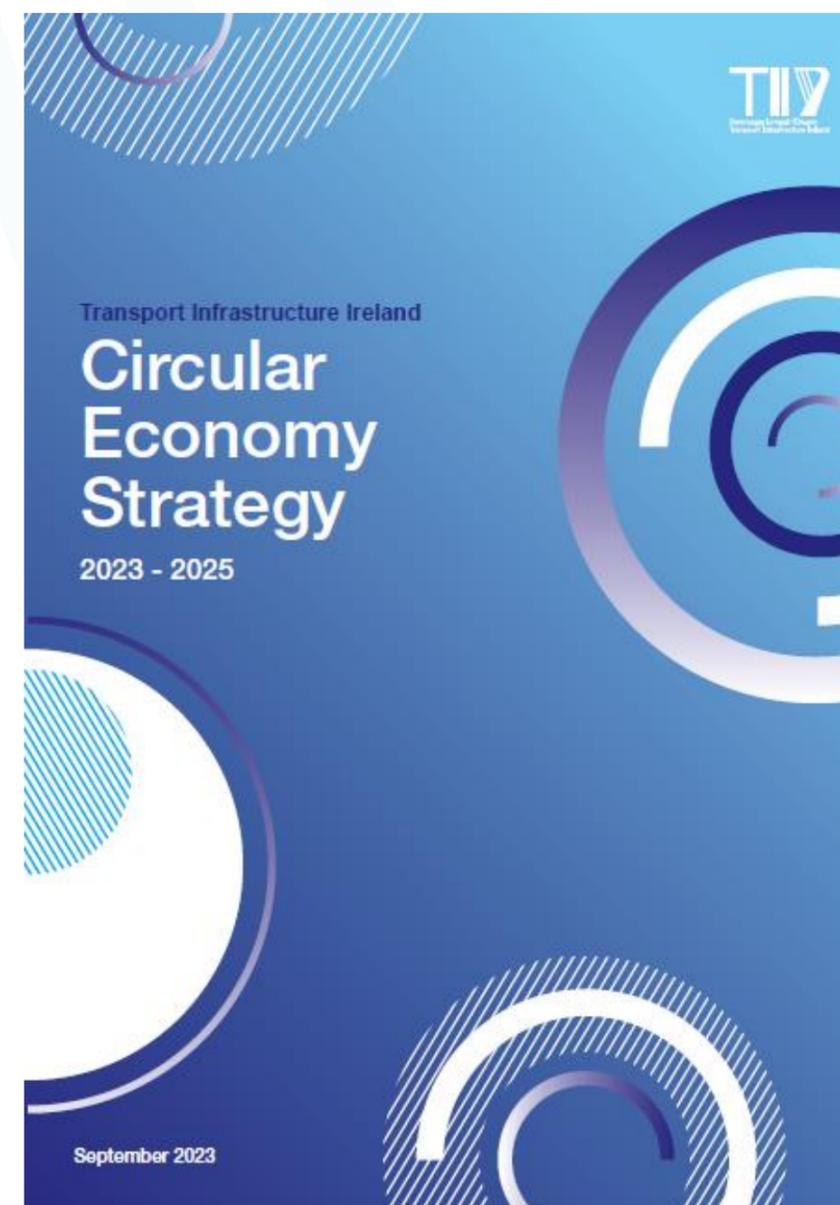


Government Policy

Reports and Publications



TII Circular Economy Policy and Strategy



TII Circular Economy Policy

Circular Economy in Ireland

Purpose

Policy and Strategy underpinning the TII approach to circular economy

Objectives

Focus Areas



Circular Economy

Objectives

- Reduce **Resource Consumption**
- Keep Assets Components and Materials at their **highest value**
- Maintain **safety** and technical function of services, assets and components
- Promote restorative and regenerative **design**
- Reduce **emissions**



LUAS SEAN HEUSTON BRIDGE

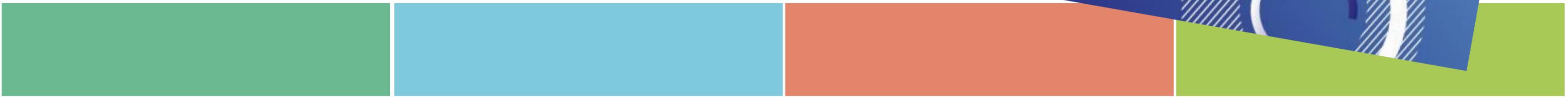
TII Circular Economy Strategy

Circular Economy and TII's Strategic and Sustainability Aims

Focus Areas

TII Approach

Circular Economy Actions



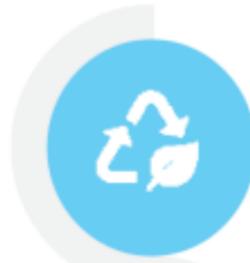
TII Circular Economy

Focus Areas



DUNKETTLE INTERCHANGE

Materials and Data



Life Cycle Assessment



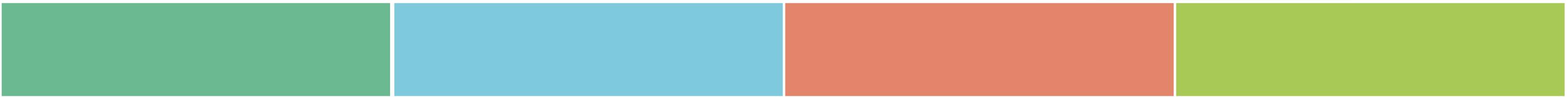
Asset Management

Collaboration



Transformation to Circular Systems

Procurement



Circular Economy Strategy

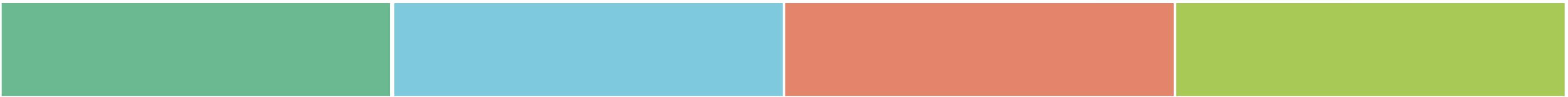
Steps TII will be taking to transition from a linear to a circular economy



Collaboration

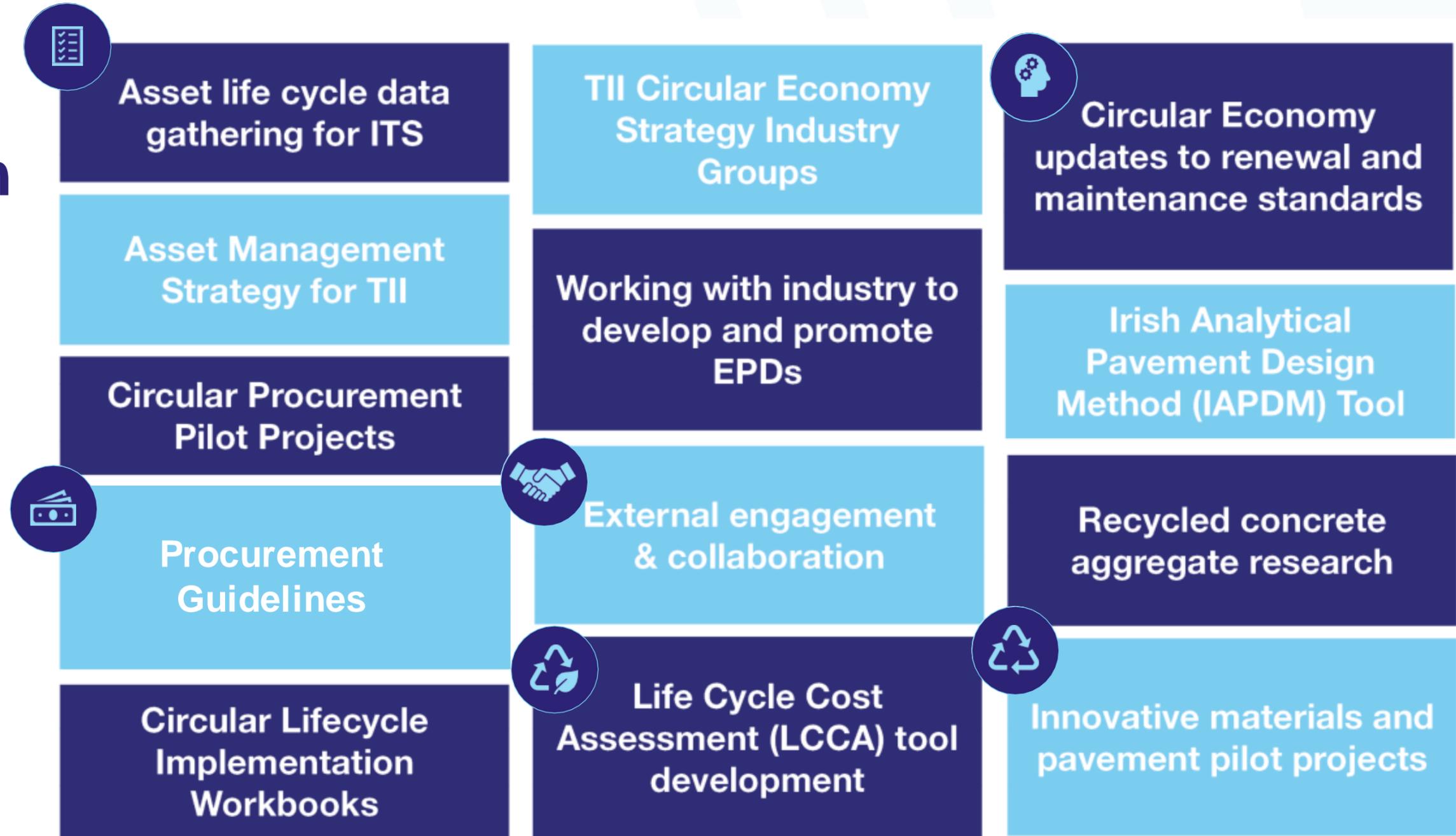
A series of circular economy workshops were undertaken with:

- Supply chain
- Local authorities
- Construction Industry
- Road Users
- Designers



Circular Economy Strategy

Steps TII will be taking to transition from a linear to a circular economy

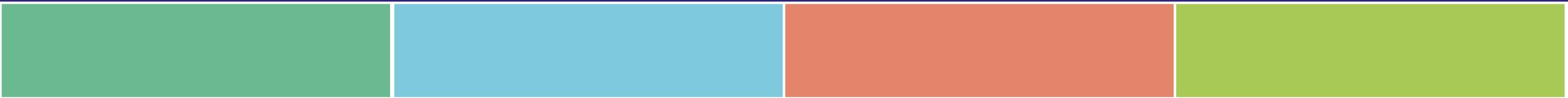


Applying the Principles and Resources



Applying the Principles

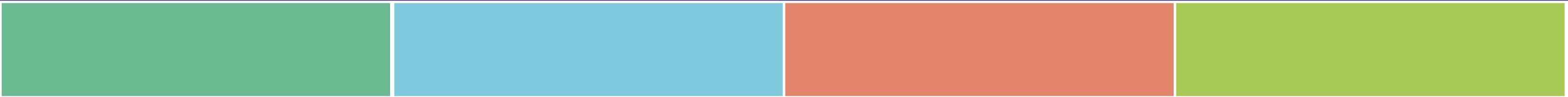
What are you already doing to create a circular economy?



Applying the Principles

What are you already doing to create a circular economy?

What are you doing to reduce natural resource consumption?



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Have you a plan for the waste generated on the project?

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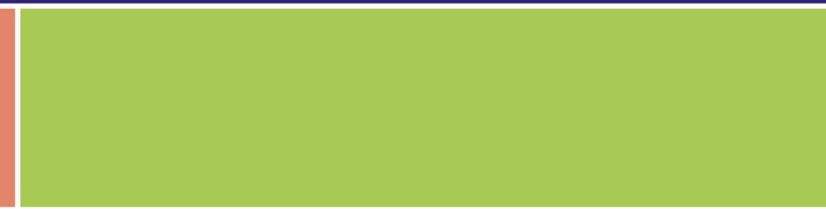
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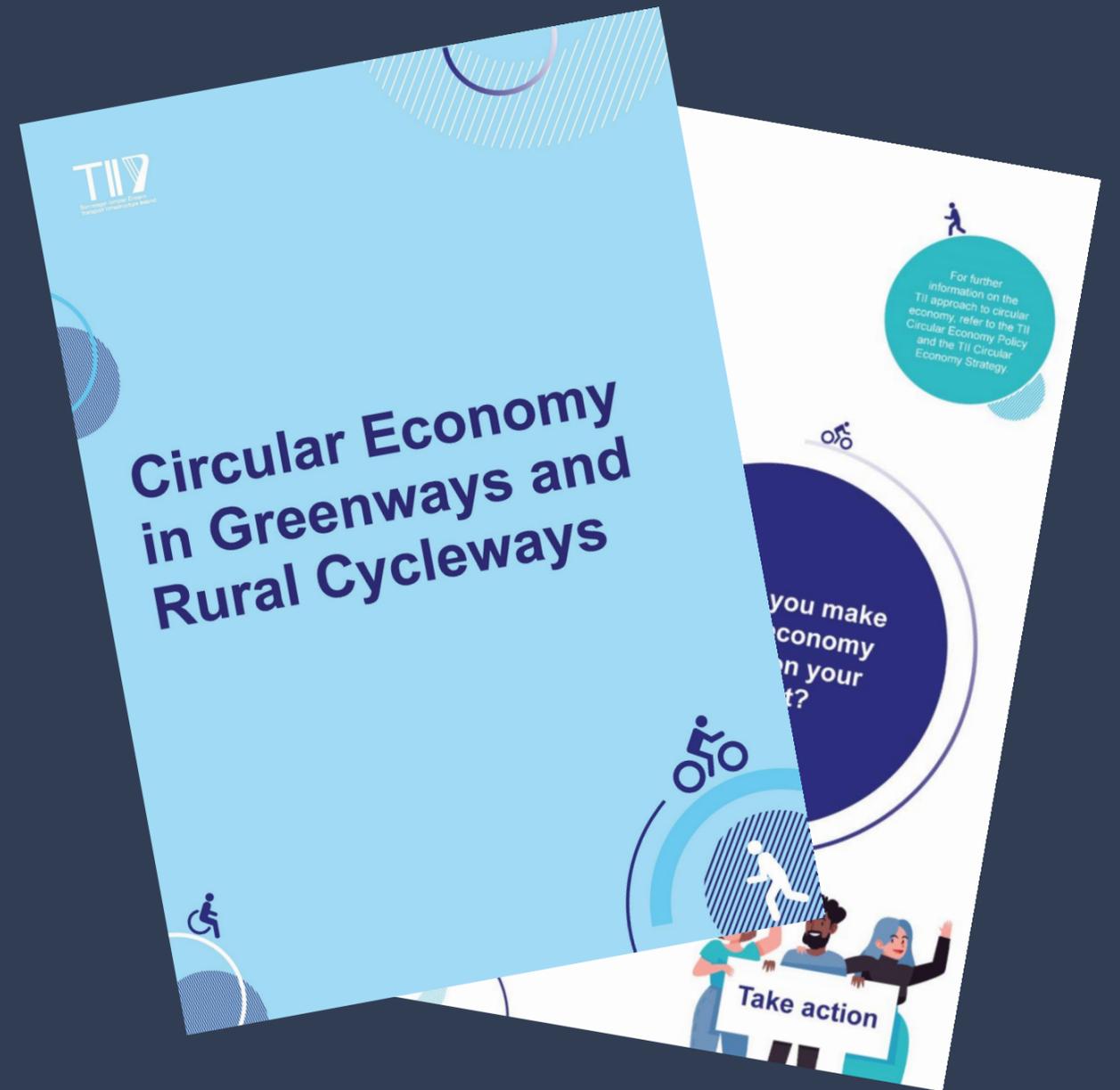
What are you doing to reduce natural resource consumption?

Have you reused something at its highest value in a project instead of recycling it?

Have you designed a part of a project to be reused multiple times?



How can Circular Economy be implemented on Greenways and Rural Cycleways?



Extract: Circular Economy in Greenways and Rural Cycleways

Bring new life to local and heritage assets

Map materials in the area that could be incorporated in the greenway. Can railway sleepers become tables or benches? Can old buildings become shelters, rest areas, or businesses? Can the foundations from heavy machinery accommodate a coffee van or a bike depot?

Maintain digital material logs

Retain material data and sources, expected re-use and recyclability in easily accessible format for operation and maintenance.

Greenways projects often have the space and capacity in terms of land and resources, to add natural capital and social value to projects. Actions can be taken on linear projects, subject to local needs and planning requirements, to integrate them with and enhance local ecosystems and communities.

Natural Capital and Social Value

- Identify opportunities to increase the size and enhance the condition of a core conservation habitats and create better connectivity between high quality core habitats;
- Identify and implement opportunities to create habitat, and manage habitats sensitively such as through "Low mow" regimes for maintenance of grassed areas;
- Consider native species planting and habitat connectivity (e.g. through the use of wildlife bridges and badger passes);
- Utilise landscaping to integrate soft features and mitigate visual impacts; and
- Adopt soft solutions where possible, such as integrated wetlands over traditional retention ponds.

Understand resource flows

- Map volumes, properties and potential re-use of pavement, structural, earthworks and ancillary materials at Phase 2; and
- Research how these materials are supplied and where they will go if they leave the project.

Design for the life cycle

Adopt design for disassembly concepts including modularity and adaptability to minimise material use in maintenance, repair and upgrade. Short lifespan technology needs to be designed for deconstruction.

Minimise material use by design

- Apply performance-based methods such as the Irish Analytical Pavement Design Method (IAPDM);
- Maximise recycled content of pavement materials;
- Monitor material use throughout the design - especially concrete, earthworks and steel;
- Minimise earthworks and incorporate existing root layer to support paths; and
- Consider renewable energy sources in remote locations to reduce ducting.

Plan for material re-use

- Which existing materials can be integrated on the project and where do they need to be stored and certified?
- Which materials will leave the project? Where will they be stored and which permits need to be in place?
- Incorporate contract requirements and monitoring for re-use of materials during construction, operation and maintenance.

Create positive environmental impact by design

- Monitor and minimise carbon emissions from concept stage;
- Monitor and maximise positive impacts on biodiversity, including light, noise, air, water and habitat connectivity; and
- Plan for storage and testing of living soils.

Establish digital material logs

- Incorporate data on material sources, re-use and recyclability in the digital project environment to allow use of the information later in the life cycle; and
- Update with construction information.

Effective material management

Manage materials and resources on site to retain their value.

Maintain for the life cycle

- Maintain design for disassembly concepts integrated in the design; and
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Low impact construction methodology

- Minimise weight and emissions of construction equipment; and
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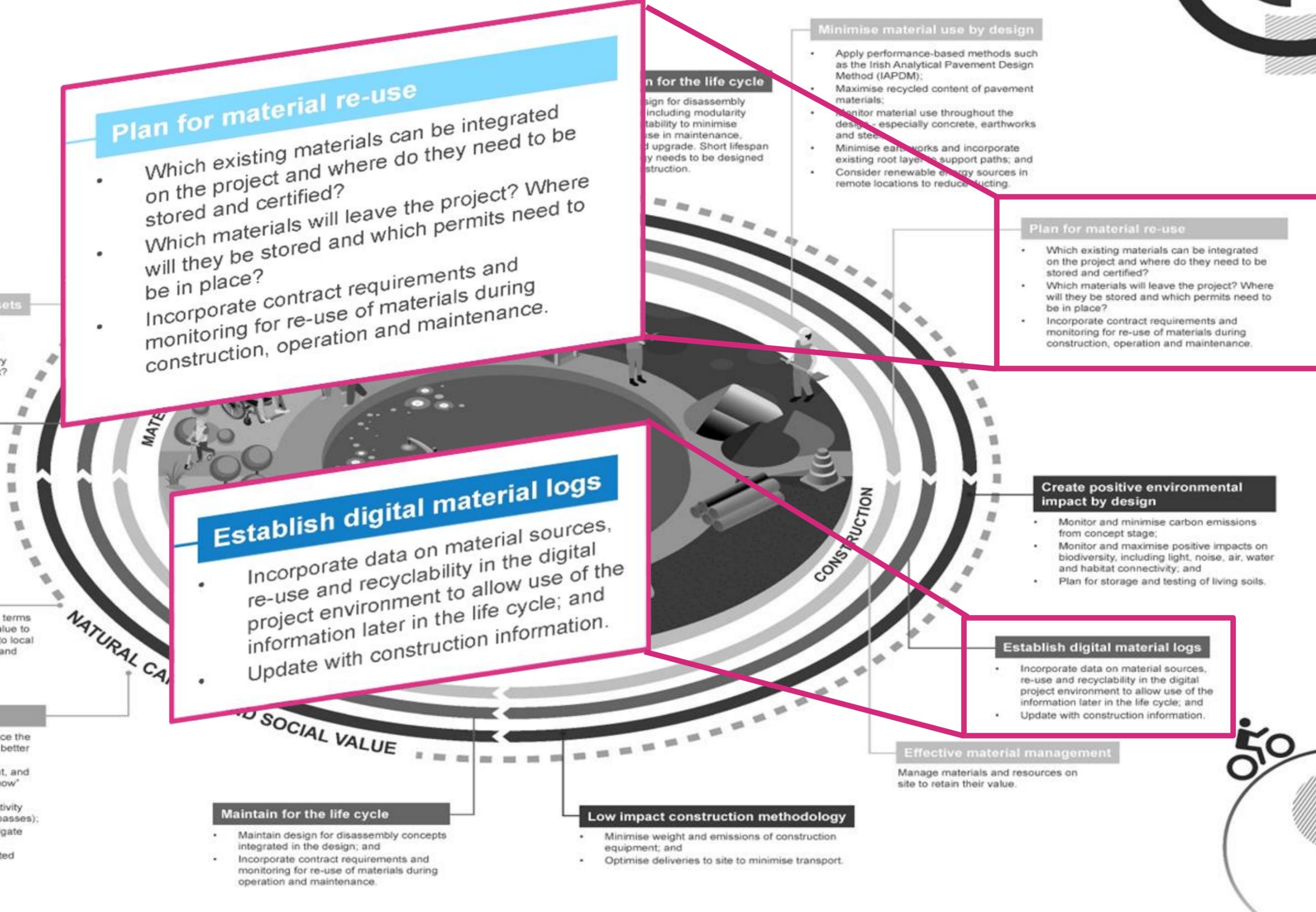
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Enhance digital material logs

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Resource management

Identify and manage resources on site to retain their value.

NATURAL CAPITAL AND SOCIAL VALUE

USE

DESIGN

CONSTRUCTION SITE

CONSTRUCTION



Circular Economy in Greenways and Rural Cycleways

Navigating circularity in regulations, standards and processes

Phase 2
Option
Selection

Phase 3
Design &
Environmental
Evaluations

Phase 4
Statutory
Processes

	Materials or Product Standards	Supply Chain Consideration		
Phase 2	<ul style="list-style-type: none"> Identify material standards for re-use (e.g. TII Specification for Road Works Series 600 Earthworks, Series 800 Road Pavements - Unbound and Hydraulically Bound Mixtures); Identify clause within standards which permit re-use of material and allowable % by weight of re-used materials. If re-used product is not permitted, consider if a departure application is required; and Identify ground investigation test requirements for each option. 	<ul style="list-style-type: none"> Review the facility permits/licences of the materials and products source sites; Desk study on locations of relevant facilities for processing and/or storage near the option; and Understand the market need for each expected re-used material. 	<ul style="list-style-type: none"> Understand expected costs for processing, storage and transport of products and materials; Understand what technology is in place for processing of materials; and Seek certification by Market Surveillance Authority if required. 	<ul style="list-style-type: none"> Detail quantity of material required in tonnes for the development; Detail storage required for the design (i.e., volume, location etc.); Size and identify storage site locations for materials or components. Ensure it is identified in the planning consent application documentation; and Set destination site locations and detail in the planning consent application documentation.
Phase 3	<ul style="list-style-type: none"> Undertake earthworks materials assessment as part of ground investigation; Capture decisions and changes made and document circularity aspects in the Options Selection Report; Undertake hazardous or scarce material testing or risk assessment; Begin type testing to ensure re-used materials meet specifications; and Undertake more detailed earthworks and pavement materials assessment as part of ground investigation. 	<ul style="list-style-type: none"> Identify if risk assessments are required for each material; Identify if there is a precedent where similar Article 27 By Products has been determined; Identify if Article 28 End of Waste rules for the product or material are in place; and Identify if further processing is required and if a permit/licence is required. 		
Phase 4	<ul style="list-style-type: none"> Refer to material and product standards within the planning application. 		<ul style="list-style-type: none"> For re-used and recycled content, note source site location in the planning application & ensure it has required consents; Apply for, or ensure necessary storage sites have, permits/licence. 	<ul style="list-style-type: none"> Ensure that regulatory processes around material re-use are aligned with planning documentation and include details in planning consent documentation.

- Understand expected costs for processing, storage and transport of products and materials;
- Understand what technology is in place for processing of materials; and
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PROJECT AND PROGRAMME LEVEL RESOURCES



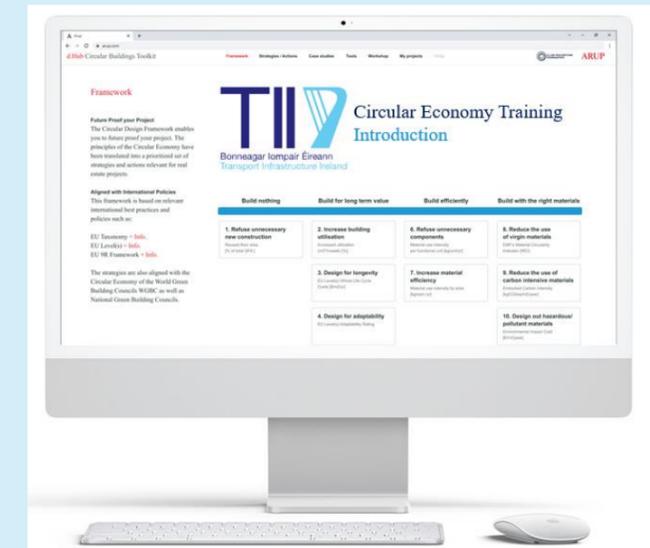
CE Guides for Road, Rail & Greenways Projects

- High Level Guidance



Circular Lifecycle Implementation Workbooks

- Develops CE skills via project related questions – focus on early stages of a project



Circular Economy Resources

- Online format

Thank you

