



# Integration of Circular Economy Approaches into a Major Infrastructure Project Case Study - National Highways' A303 Circular Economy Pathfinder Project

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## Abstract

Whilst the concept of the circular economy is not new, experience of and guidance for, its practical application continues to evolve. There are currently few case studies for the application of circular economy approaches to the design and delivery of major infrastructure projects. This paper summarises experience, key activities and achievements in the implementation of circular economy approaches through the Development Phase of the A303 Amesbury to Berwick Down (Stonehenge) road scheme, a Nationally Significant Infrastructure Project. The A303 Stonehenge scheme is the one of the first complex infrastructure projects in the UK to focus on the integration of circular economy approaches from the Preliminary Design stage. This paper summarises activities undertaken as a National Highways 'Circular Economy Pathfinder Project' between 2017 and 2021, during the Preliminary Design through to Construction Preparation stages of the scheme. The Pathfinder Project sought to identify stakeholders and establish mechanisms to integrate consideration and application of circular economy approaches into the scheme's current Development and future Construction Phases. The work described is not specific to the A303 Stonehenge scheme, the general approach developed, and opportunities identified will influence this scheme and also inform other National Highways' road schemes. The paper summarises experience and achievements to date, the approach is expected to continue to be developed through future road schemes. The paper describes the application of circular economy approaches by reference to National Highways' Major Project Cycle and applicable planning requirements, however, the general approach and outcomes achieved are broadly similar to, and therefore transferrable to other major infrastructure projects. This paper is expected to be of interest to those interested in the practicalities of the transition to the circular economy.

**Keywords** Case study · Circular economy · Resource efficiency · Sustainable development · Major infrastructure · Road scheme

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## Introduction

The application of circular economy principles to design, construction and management of roads, is a relatively recent development [1]. A review [2] of how European National Road Authorities (NRA) communicate to the broader public their commitment to the circular economy, and what they are doing to integrate circular economy practices into their operational approaches, found ‘...there is still a significant opportunity for knowledge development in the field of road engineering agencies and on the topic of circular economy’.

Whilst there is guidance available for the general application of circular economy approaches at organisational level [3, 4], and high-level guidance on environmental / circular economy opportunities associated with road infrastructure [5, 6], there is currently limited published information describing practical experience of the implementation of circular economy approaches through the design and development of major road schemes.

This paper summarises experience of the application of circular economy approaches through the Development Phase of the A303 Amesbury to Berwick Down (Stonehenge) road scheme, a Nationally Significant Infrastructure Project (NSIP) in the UK. The National Highways Pathfinder Project described sought to identify key stakeholders and establish mechanisms to integrate consideration and application of circular economy approaches into the scheme’s current Development and planned Construction Phases. The approach described is not specific to the A303 Stonehenge scheme, the general approach developed, and opportunities identified, will influence this and other future National Highways’ road schemes.

The paper seeks to:

- Provide a case study for the application of circular economy approaches to the development of a major infrastructure project, including integration of circular economy approaches using a pre-existing project delivery framework;
- Share experience, of the approach to the translation of principles into practice, consistent with the circular economy tenet of ‘collaboration’ and to help address the reported lack of circular economy specialists in the sector; and
- Help bridge the gap between practitioner / sector activity and academic literature.

The paper is expected to be of relevance to those with an interest in the practical application of circular economy approaches, including those involved in the development and delivery of major infrastructure projects.

The paper is structured to provide:

- A Literature Review providing the context and objectives of the work described;
- A summary of the key Development Phase circular economy activities undertaken through the A303 Pathfinder Project (Method);
- The results achieved, with specific focus on awareness and communications, influence and opportunities; and identification of and collaboration with stakeholders (Results);

- Consideration of the wider context for the Pathfinder Project with potential next steps (Discussion); and
- Conclusions and limitations applicable to the work described.

## Literature Review

### The Circular Economy

There is growing recognition that the traditional linear, ‘take, make, use, dispose’ economic model may be reaching its limits and the availability of cheap, easily accessible materials and energy can no-longer be taken for granted [3, 4].

The circular economy challenges the way products and resources are produced and consumed and aims for a sustainable global economic system. In an organisational context, the circular economy refers to the systemic approach to the design of processes, products, services and business models, enabling sustainable economic growth by managing resources more effectively as a result of making the flow of materials more circular and reducing and ultimately eliminating waste [4].

A circular economy is a global economic model that aims to decouple economic growth and development from the consumption of finite resources and has other sustainability benefits including the potential to reduce energy consumption and greenhouse gas emissions [3, 4, 7].

The concept of the circular economy has evolved over time and there is currently no consensual, definitive definition, however, the Ellen McArthur Foundation’s characterisation of the concept [3] ‘as an economy that is restorative and regenerative by design, and aims to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles’ is widely accepted.

Summaries of the evolution of thinking and definition of the circular economy, include the Ellen McArthur Foundation [3] as well as others [e.g., 4, 8, 9]. The work described in this paper is focussed on the practical application of the circular economy as defined by the Ellen McArthur Foundation above.

There is widespread recognition of both the value and also the relative lack of case studies describing the practical transition to the circular economy, for example:

- Hart et al. [10] noted the value of ‘collaboration’ and case studies as cultural and sectoral enablers for the circular economy;
- Pauliuk [11] suggests ‘one reason for the lack of more specific guidance (in BS 8001:2017) may lie in the early stage of circular economy development and resulting lack of relevant experience from circular economy reality’; and
- Mantalovas et al. [2] report a significant lack of circular economy expertise and communication within European National Road Authorities.

## Implementation of Circular Economy Principles in Road Construction and Maintenance

Transport infrastructure including the strategic road network (SRN) is an important element of built infrastructure. However, the application of circular economy principles to an asset, such as a road pavement, is a relatively recent action [1].

There is currently limited published information addressing the integration of circular economy approaches into major infrastructure projects. A notable example is High Speed 2 Ltd (HS2), a major UK rail project which has reported corporate commitment [12] and initial work to establish, embed and communicate circular economy principles, realise opportunities and report outcomes [13]. HS2 note the value of a ‘top down’ and ‘bottom-up’ approach to embedding circular economy principles, the intended role of the supply chain to identify and implement the majority of opportunities and the requirement for future research to identify specific metrics related to the circular economy.

The Roadmap to a Resource Efficient Europe [14] recognised the potential of improved construction and use of built infrastructure in achieving significant resource savings and environmental / sustainability benefits. The European Commission’s Joint Research Centre [5] collated research and best practice to inform the preparation of ‘green public procurement criteria’ for improving the environmental performance of road design, construction and maintenance. The criteria include opportunities for more sustainable and circular approaches focussed on aspects / considerations including:

- Resource efficient construction - the materials used and their durability;
- Recycled content - use of reused / recycled materials and by-products;
- Material transportation - the impact of transport of ‘bulk materials’ such as aggregate on greenhouse gas emissions;
- Asphalt – production of ‘hot mix’ and ‘low’ temperature asphalt;
- Excavated materials, soil, and wastes management - planning for reuse;
- Water and habitat conservation - habitat creation and / or enhancing existing habitat; and
- Maintenance and rehabilitation strategy - planning from detailed design.

The European Commission’s Circular Economy Principles for Buildings Design [6] also provides general principles relevant to road schemes and applicable throughout the value chain including:

- Decisions must take into account total life cycle costs, financial and non-financial;
- Proportionality should be considered when applying principles - benefits should outweigh costs;
- Better knowledge is needed about construction techniques to facilitate deconstruction and to enhance durability and adaptability;
- Durability depends upon better design, improved performance of construction products and information sharing;
- Avoiding premature building demolition through the development of a new design culture;
- Design products and systems so that they can be easily reused, repaired, recycled or recovered; and

- There must be reliable markets for used products and materials.

A recent review of ten European National Road Authorities' approaches to the circular economy implementation and communication [2] found that, although the majority of European NRAs are familiar with circular economy as a concept, few actions had been taken towards its holistic implementation and 'there is a significant lack of expertise and communication within these bodies'. The NRAs surveyed reported 'designing out waste', the 'use of waste as a resource' primarily through incorporation of reused or recycled materials into asphalt and asphalt recycling; and 'extension of asset service life' through preventative maintenance as widely adopted initiatives. However, the report found that the principles of the circular economy are not yet well established within the transportation sector.

Whilst accepting these general findings, the current authors note that the lack of communication may, in part be due a 'disconnect' between practitioners and academia, with practical experience either unpublished or published in the 'grey literature' and therefore not finding a wider audience. However, as observed by Mantalovas et al. [2], NRA communication of commitment to the circular economy, and actions to implement circular practices into operational approaches can have significant positive impact and value, including influencing the behaviour of consumers [15] as well as other stakeholders such as supply chain partners, contractors etc.

The review [2] also noted that Highways England (now National Highways) was the only European NRA surveyed that had published an 'Approach and Routemap' towards circular economy, in which future visions and plans that are aligned with the implementation of circular economy are described [16].

## **National Highways and the Circular Economy**

National Highways is the government company charged with operating, maintaining and improving England's motorways and major A roads for the benefit of road users. The SRN of around 6,900 kilometres represents only two per cent of all roads in England by length, but these roads carry a third of all traffic by mileage and two thirds of all heavy goods vehicle traffic [17, 18].

Having recognised the need for and potential benefits of the circular economy, National Highways began to plan its corporate approach to the transition to the circular economy with the development of a 'Circular Economy Routemap' [16]. The Routemap predates, but broadly aligns with the principles and approach given in BS 8001:2017, Framework for implementing the principles of the circular economy in organizations - Guide [4], with National Highways then (2015/16) at the 'Framing' and 'Scoping' stages (stages 1 and 2) of the eight-stage flexible framework provided in BS 8001. The approach has subsequently evolved with the Routemap informing National Highways' Sustainable Development Strategy [19] and Action Plan [20] which includes a commitment to the development of pathfinder projects to demonstrate the circular economy concept in action and integrate circular economy principles more widely.

Preliminary work to develop the Routemap included engagement with stakeholders to help understand and define what the circular economy means in practice for National Highways. This activity supported the adoption of the Ellen McArthur Foundation's characterisation as a 'working definition' [3]. At a practical level, for National Highways, this means:

- Minimising demand for primary resources and maximising reuse of resources already in use on the network in as high a value application as is possible;
- Being innovative, finding new ways to deliver a more resilient and adaptable network – seeking efficiency and value for money;
- Working to achieve security of supply;
- Seeking to reverse biodiversity loss and in the longer term, delivering biodiversity gains; and
- Adopting a natural capital approach to capture the value of National Highways’ off-road land holding. [16]

National Highways’ Sustainable Development Strategy [19] states the organisation’s commitment against the five capitals of sustainable development. Key elements of the vision and ambition for circular economy are set out under the Manufactured Capital theme, which applies to National Highways’ management of resources including built assets, such as structures and technology. However, the scope of definition and aspirations for practical application include supporting biodiversity and natural capital. National Highways’ approach is a natural progression from established practices in the delivery of road schemes, such as resource efficiency, responsible and sustainable sourcing, and reducing adverse environmental impacts.

National Highways has started to integrate circular economy approaches into its standards and the delivery of its largest projects. The Design Manual for Roads and Bridges (DMRB) [21], includes some key circular economy principles. For example:

- The general principles and scheme governance standard for Sustainable Development and Design, GG103 provides 12 goals for sustainable development with accompanying requirements. One of the goals is ‘to be resource efficient and reflect a circular approach to the use of materials’;
- A National Application Annex to DMRB, GG103, applicable to the SRN in England and Northern Ireland, includes additional requirements around minimising the consumption of materials, and designing for future high value recycling, re-manufacture or re-use; and
- An ‘environmental assessment’ document [22] requires alignment with the principles of the European Commission circular economy package in schemes subject to environmental impact assessment.

The A303 Amesbury to Berwick Down (Stonehenge) road scheme is National Highways’ second Circular Economy Pathfinder Project, the first focussed on the A14 Cambridge to Huntingdon Improvement scheme [16]. Both schemes are complex infrastructure projects; the A14 Pathfinder Project started in 2016 and the A303 (Stonehenge) scheme Development Phase activities described in this paper, started in August 2017.

The A14 Cambridge to Huntingdon improvement scheme, which upgraded the strategic route between Ellington, to the West of Huntingdon, and Milton, in the North-East of Cambridge, was the first National Highways Pathfinder Project to implement a circular economy approach with partners throughout the supply chain, including the project contractor and designer. A14 project level adoption of the circular economy began overtly at the detailed design during stage 5, see Fig. 1, with project level adoption of the circular economy informed by the Ellen Macarthur Foundation’s ReSOLVE (Regenerate, Share, Optimise, Loop, Virtualise, Exchange) framework [3].

The A303 (Stonehenge) scheme forms part of a package of proposals for the A303 / A358 corridor to deliver a high quality and high performing dual carriageway to improve the connection between the South West and South East of England. The scheme's key features [23] include:

- A bypass to the north of Winterbourne Stoke with a viaduct over the River Till valley;
- A new junction at Longbarrow with the A360 to the west of the World Heritage Site, with the A303 passing under the junction;
- A section through the World Heritage Site with a twin-bore tunnel past Stonehenge around 3.3 kilometres in length; and
- A new junction between the A303 and A345 at the existing Countess Roundabout.

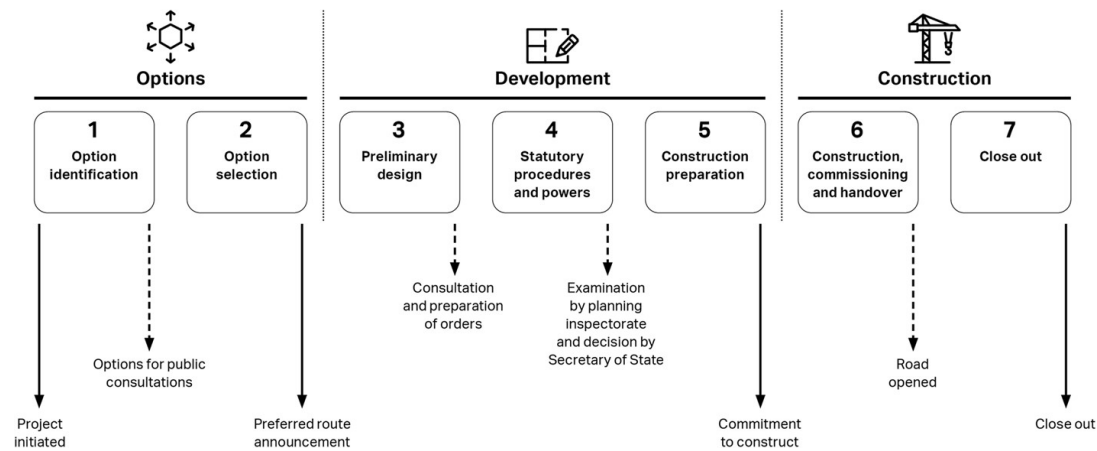
National Highways' standard design life when designing a pavement for a new carriageway is 40 years [24] with the environmental assessment undertaken against a project operational life span of 60 years [25], however, as 'national infrastructure' the A303 Stonehenge it is expected to remain in use, with maintenance, indefinitely. The A303 scheme is defined as a 'Nationally Significant Infrastructure Project' (NSIP) under the Planning Act, 2008, so an application to the Secretary of State for a Development Consent Order (DCO) was required. This application included an Environmental Impact Assessment (EIA) which was subject to public consultation and examination [26]. The status of scheme is undecided at the time of writing [27].

Although the circular economy activities for the A303 scheme started in August 2017, the scheme was not formally designated a 'Pathfinder Project' until later in the Preliminary Design stage. This paper summarises activities and results achieved, up to the end of December 2021. The A303 Pathfinder Project Development Phase activities described align with the 'Idea generation', 'Feasibility' and 'Business case' stages (stages 3, 4 and 5) of the BS 8001:2017 flexible framework for implementing the circular economy.

The A303 Pathfinder Project is aligned with National Highway's Sustainable Development Strategy [19] and Action Plan [20] and builds upon the activities and experience gained through the A14 Pathfinder Project. The key objectives of the A303 Pathfinder Project were the development and recording of the approach used to identify and help realise circular economy opportunities in the built scheme to inform the delivery of this and future National Highways schemes.

A key element of both Pathfinder Projects was the attempt to identify and record all potential resource efficiency / circular economy opportunities, even those which may be unsuitable for the current scheme due to economics, timing, logistics, commercial considerations, geography etc. The list of opportunities generated is intended to support the development of 'menus' which have the potential to inform and help structure the approach taken by future schemes. This approach recognises that opportunities do not have to be scheme-specific or original to have value and is intended to help avoid situations where opportunities are missed due to their being recognised or considered too late for implementation on a given scheme.

The A14 Integrated Delivery Team identified and recorded about 60 opportunities during stage 5, 'Construction Preparation'. The majority of these opportunities are generic in nature and therefore potentially applicable to the A303 scheme. Many people were involved in the identification of these opportunities including National Highways' Environmental Advisors, Supply Chain Manager, and construction sub-contractors [16].



**Fig. 1 National Highways' Major Project Cycle.** The diagram as shown assumes a NSIP. Depending on the planning route, consultation and planning procedures will vary

Figure 1 redrawn from Highways England [28] shows National Highways' major project cycle, with the Project Control Framework (PCF) stages and key decision points indicated. Highways England (National Highways) launched the project control framework in its Major Projects directorate in 2008. The framework sets out how National Highways, together with the UK Government's Department for Transport, manage and deliver major improvement projects. It is designed to ensure that road projects meet customers' aspirations in a cost efficient and timely manner.

Following a Pre-Project Phase of strategy shaping and prioritisation ('stage 0'), the Project Control Framework comprises three further Phases, 'Options', 'Development' and 'Construction' with seven stages, each accompanied by standard deliverables and governance arrangements. The key stages of the Major Project Cycle are summarised in Table 1 below which is derived from [28].

## Method

Key Development Phase circular economy activities, dates and outputs are summarised below. Please note dates relate to Pathfinder Project activities – the A303 (Stonehenge) scheme is in stage 5 at the time of writing.

### Stage 3 - Preliminary Design (September 2017 – September 2018)

Stage 3 circular economy activities sought to raise awareness of, identify and promote circular economy approaches through:

- i) Presentations to the project Design ('Solutions') and EIA Teams. The presentations introduced the concept of the circular economy, provided examples of opportunities identified through the A14 Pathfinder Project and prompted discussions to help identify further opportunities for the A303 scheme.
- ii) Identification of, and collaboration with, other elements of the scheme's delivery team with common objectives.



**Table 1** Summary of the key stages of the Major Project Cycle

PCF Stage Number and Name	High level overview of the stage
Stage 0 - Strategy, shaping and prioritisation.	Potential transport issues are identified and prioritised. Feasibility studies, initial analysis and appraisal are conducted.
Stage 1 – Option Identification	Traffic modelling and economic assessment is undertaken on a number of options. A robust traffic assessment is needed to assess whether the proposed solution will mitigate an identified problem and any consequential adverse impacts, for example on the environment. Economic appraisal of transport schemes is required in order to assist decision-makers prioritise between schemes and options. A key output is the Technical Appraisal Report.
Stage 2 – Option Selection	A variety of online and public events are held at which the public are consulted. Further refinements will be made to the traffic modelling and economic assessment and by the end of the stage, a decision on which option to progress is made with a public announcement on this preferred route.
Stage 3 – Preliminary Design	Topographical, geotechnical and environmental surveys are undertaken to help develop the design of the selected route. Projects carry out further public consultation on the proposed design.
Stage 4 – Statutory Procedures and Powers	Dependent on the planning route the scheme will progress through the relevant planning process, whether examination or potentially a public inquiry.
Stage 5 – Construction Preparation	Orders / development consent are confirmed, and High Court challenges are responded to (if any). Pre-construction design is completed in line with the results of the legal processes, in sufficient detail to enable the contractor to construct the project. Contracts are awarded and final construction costs are agreed. Contractors are instructed to start construction.
Stage 6 – Construction, Commissioning and Handover	The project is constructed and (where applicable) technology is tested and commissioned. The road is opened to traffic.
Stage 7 – Close Out	The contractor completes any outstanding works (or re-work), corrects any defects and ensures that any environmental mitigation measures are successful. A review of project delivery / benefits analysis is undertaken, and lessons learnt are identified and shared.

- iii) Identification and classification of resource efficiency and circular economy opportunities, with creation and maintenance of a ‘live’ list of potentially applicable opportunities, through:
- Review of opportunities previously identified for the A14 for potential applicability to the A303;
  - Review of the ‘baseline design’ using the A303 (Stonehenge) scheme Design Solutions Log;
  - Engagement with the scheme’s designers and other stakeholders, including delivery of a Design for Resource Efficiency / Circular Economy Workshop; and

- Limited research to identify innovative products and solutions potentially relevant to the scheme.

The approach and structure of the Resource Efficiency / Circular Economy Workshop was primarily informed by the Waste and Resources Action Programme (WRAP)'s Design for Resource Efficiency guidance [29], the Ellen MacArthur Foundation's ReSOLVE Framework [3] and CEEQUAL assessment data requirements [30]. Review focussed on the identification and consideration of potential opportunities, building upon potentially transferable generic opportunities identified through the earlier A14 Pathfinder Project and including preliminary consideration of their potential for implementation through the A303, but not extending to detailed technical review.

- iv) Discussions with the scheme's Benefits Realisation Management Team about opportunities to integrate circular economy requirements during procurement.
- v) Recording and reporting of activities, including what worked and why, with recommendations for next steps, to inform and align with National Highways' wider corporate circular economy objectives and activity.

#### **Stage 4 - Statutory Procedures and Powers (July 2019 – February 2020)**

Pathfinder Project stage 4 activities continued those started during stage 3 and also sought to:

- i) Identify actions to facilitate integration of opportunities within scheme development.
  - ii) Engage with the scheme's Procurement Team to support the consideration of circular economy approaches during procurement.
- The circular economy opportunities identified during stage 3, as having potential applicability to the A303 were reviewed by the scheme's Project Director at the start of stage 4 to assess their suitability for implementation through the A303. Opportunities either incorporated within the preliminary design or having potential to be incorporated within the design or later stages of the scheme were referenced against the relevant DCO and / or Outline Environmental Management Plan (OEMP) commitments [31] to establish where and how they aligned with existing project requirements.
  - Ten 'core' project circular economy themes were identified through consideration of National Highways' corporate approach to the circular economy, the circular economy opportunities identified during stage 3, BS 8001:2017 and the ReSOLVE framework.<sup>1</sup> Where potential opportunities with no supporting DCO, OEMP commitments or CEEQUAL requirement were identified, these were reviewed with the scheme's Benefits Realisation and Procurement Teams. Where appropriate, additional scheme requirements were developed and applied through the 'Invitation to Participate in a Dialogue'

<sup>1</sup> It is recognised that the 'core themes' of circular economy are contingent upon context and definition of circular economy used. It is also acknowledged that many of the opportunities fall into multiple CEEQUAL 'action areas' and hence, allocation to a particular category was to some extent arbitrary and, in this context, relatively unimportant.' The 'core themes' was simply a mechanism used to structure the cross-referencing [35].

(ITPD) issued to potential Main Works Contractors to help integrate circular economy opportunities into the scheme.

- iii) Investigate potential metrics for the monitoring and evaluation of the Pathfinder Project and its impact on scheme delivery.

### **Stage 5 – Construction Preparation (April 2020 – December 2021)**

Pathfinder Project activities continued from stage 4 with focus on:

- i) Identification and collaboration with internal stakeholders; including those responsible for Benefits Realisation, Efficiencies, and Carbon Management, and the scheme's CEE-QUAL Assessor;
- ii) Review of potential circular economy metrics and indicators to inform and facilitate monitoring and evaluation of this aspect of scheme performance; and
- iii) Identification of opportunities and mechanisms to integrate the circular economy into the scheme's delivery framework.

## **Results**

### **Awareness and Communications**

A303 Pathfinder Project stage 3 stakeholder communication was primarily focussed on the internal project team, with communications extended to external stakeholders during stages 4 and 5.

Earlier work [16] established National Highways' working definition for the circular economy and how this translates into action. Stage 3 activities concentrated on raising awareness and understanding of National Highways' commitment to the circular economy and then, using examples, highlighting how stakeholders can contribute to achieving this. This approach helped identify existing opportunities within the scheme's design, which may not previously of been recognised as supporting the circular economy and new opportunities for further consideration.

National Highways' Routemap [16] recognises the value of the communication, monitoring and reporting of National Highways' transition to the circular economy. Identifying the scheme as a 'Pathfinder Project' at the end of stage 3, demonstrated National Highways' commitment and helped to raise the project's profile internally and externally.

External communication was primarily through National Highways' participation in The Major Infrastructure - Resource Optimisation Group (MI-ROG), a forum for the UK's infrastructure operators to collaborate across the circular economy theme and to meet the challenge of delivering major infrastructure in a constrained economy [32]. External

communications included presentations to Transport Infrastructure Ireland [33] and The Institute of Environmental Management and Assessment [34] with potential suppliers, in particular keen to engage in order to highlight the sustainability benefits of their products and services.

## Influence and Opportunities

Resource efficiency / circular economy opportunities were identified on the basis that they have ‘an element of innovation’ that was not part of the normal process of environmental mitigation. This approach worked as a practical way to filter the potential opportunities to be recorded, but resulted in some opportunities being recorded, and then subsequently ‘discarded’ as being ‘standard practice’ following review by technical specialists. Examples of potential opportunities identified through the Pathfinder Projects are given below, with further examples provided in a recent MI-ROG Technical Note, ‘Using CEEQUAL to Support the Circular Economy’ [35]. Most of the opportunities identified were not new or unique to the scheme but had not previously been recognised or promoted as supporting the ‘circular economy’ within the scheme.

Examples of Potential Resource Efficiency / Circular Economy Opportunities:

- i) Establish a take-back scheme with suppliers for unused materials; all packaging and pallets to be collected by suppliers.
- ii) Segregate inert waste (on or off-site) to facilitate reuse, including onsite use of demolition arisings.
- iii) Recycling of pavement planings into new asphalt.
- iv) Use of excess topsoil for landscaping and use of topsoil and excavation waste for ecological benefit.
- v) Specification of long life, low noise asphalt paving to reduce the requirement for physical noise mitigation.
- vi) Specification of weathering steel to reduce operational maintenance requirements of structures where practicable.
- vii) Increase habitat connectivity / reduce habitat fragmentation e.g. through conversion of existing but obsolete bridges into ‘green bridges’.
- viii) Design of scheme lighting to help create a ‘dark sky environment’.
- ix) On-site renewable electricity generation using photovoltaic cells or small-scale wind turbines during construction and operation.
- x) Use of leasing / product take back schemes e.g. use of reusable hoardings, made from 100% recycled plastics, which can be returned to the manufacturer for recycling at end of life.

The Scheme’s Design Solutions Log provides evidence of high-level design considerations during PCF stages 1 and 2, including the form, location and alignment of the scheme, consideration of alternative construction materials, whole life impacts and mitigation of adverse environmental impacts. However, the information recorded in the Solutions Log was found to be too ‘high level’ to be a useful source of potential circular economy opportunities.

Opportunities were primarily identified through stage 3 discussions with technical specialists from the scheme’s Design and EIA Teams, including technical specialists for materials and waste, tunnels engineering, ecology and ecosystem services.

Over 100 opportunities for material, process, and environment and / or biodiversity gains were identified during stage 3, with 23 incorporated within the scheme's preliminary design and 57 assessed as having potential to be incorporated in the Preliminary Design or later stages of the scheme. A further 27 opportunities were assessed as having limited potential for the A303 (Stonehenge) scheme but were recorded as ideas for consideration on other future road schemes.

At the end of stage 4, over half of the 80 'live' opportunities identified during stage 3 were assessed as having been incorporated into the scheme's preliminary design, or through commitments in the DCO or OEMP. A further 25 opportunities could be supported through additional contract clauses inserted into the ITPD for the Main Works Contractor, with the balance requiring further review, considered unlikely to be taken forward or not applicable to this scheme - Table 2.

A further 20 opportunities were identified during stage 5, however, these are not recorded in Table 1 as, following submission of the application for DCO during stage 4 the focus shifted from monitoring incorporation of opportunities into the scheme's preliminary design to establishing approaches to monitoring the circular economy 'performance' of the built scheme. These opportunities were recorded within the list of opportunities taken forward for consideration by other future National Highways schemes but are not specified scheme outputs for the A303 (Stonehenge) scheme.

**Table 2** Circular economy opportunities identified and considered for the A303

Number of circular economy opportunities identified and assessed	At the end of stage 3	At the end of stage 4*
Incorporated into the scheme's preliminary design, DCO or OEMP	23	50
Having potential for incorporation into the preliminary design or later stages of the scheme	57	
With the potential to be supported through contractual clauses		25
Unlikely to be incorporated / not applicable to this scheme	27	9
New opportunities for further review		6
<b>Total 'live' opportunities for the A303</b>	<b>107</b>	<b>90</b>

\*Note, whilst stage 4 opportunities included most of the opportunities identified during stage 3, some stage 3 opportunities were subsequently rejected as being 'standard practice' with new opportunities identified during stage 4

## Identification of and collaboration with stakeholders

The development and integration of circular economy approaches into the scheme's design aligns with and supports the objectives of other established elements of the scheme's management.

The principal internal 'partners' for stage 3 and 4 were the scheme's Design and EIA Teams, the CEEQUAL Assessor, Benefits Realisation Management and Efficiencies Teams. During stage 5 the focus shifted to Benefits Realisation, Efficiencies and Carbon Management with the flow of information also changing from primarily gathering information to mainly sharing information as the value of the list of circular economy opportunities was more widely recognised.

Development Phase interactions with key stakeholders are summarised in Table 3 alongside the key benefits identified as arising from the Pathfinder Project approach.

## Discussion

National Highways is one of the UK's first big infrastructure operators to commit to moving towards the circular economy [37]. National Highways' Sustainable Development Strategy [19] includes the ambition to '...push towards a 'circular' approach to...management of resources: minimising our demand for primary resources extracted from the ground and maximise the reuse of resources already in use on the network. Reutilising them in as high a value function as possible.' The A303 (Stonehenge) scheme Circular Economy Pathfinder Project sought to develop, record, inform and support National Highways' corporate approach to scheme level application of the circular economy.

The A303 (Stonehenge) scheme is one of the first complex infrastructure projects in the UK to focus on the integration of circular economy approaches from the Preliminary Design stage. Experience gained through the project is expected to be of wider interest as there are currently few circular economy case studies for major infrastructure projects and it has been suggested [2] that increased provision of insight and knowledge in terms of circular economy implementation would help the road sector develop a more holistic approach.

## Awareness and Communications

The initial objective of the A303 Pathfinder Project was to raise awareness and understanding of the circular economy and National Highways' corporate commitment within the scheme's delivery team. This was particularly important as the design was contracted out by National Highways and hence, team members were generally unaware of the National Highways' corporate ambition and commitment at the outset.

Establishing a widely recognised definition for circular economy was an essential first step in the development of National Highways' corporate approach to the circular economy. The Ellen MacArthur Foundation's definition [3] was adopted [16] as it is succinct and aligns with National Highways' corporate aspirations. BS 8001:2017 [4] was also helpful in providing clear definitions of key terms associated with sustainable resource management allowing clear and consistent communication. From a practitioner perspective, the plethora of alternative definitions for the circular economy is considered to be a potential source of confusion and hence, a potential barrier to action.

National Highways' approach to the circular economy is a natural progression from other pre-existing corporate initiatives, such as resource efficiency and supply chain management which combined with the use of relevant examples of opportunities helped internal stakeholders to understand the sustainability benefits, scope of ambition and their role in its realisation.

Raising awareness and understanding of the circular economy amongst the Design and wider project delivery team were key project outputs, enabling identification and integration of circular economy approaches through this scheme and facilitating the transfer of understanding and ambition to other road and infrastructure projects. Evolution of the project delivery team / staff changes as the scheme moved through PCF stages 3, 4 and 5 necessitated on-going activity to maintain awareness, but was also beneficial, in bringing

**Table 3** Summary of Interactions with PCF Stage 3-5 Stakeholders

Stakeholder(s)	Relevance to Circular Economy	Benefits arising from the Pathfinder Project
The scheme's Design Team and EIA technical specialists	The majority of the A303 specific opportunities recorded up to the end of stage 4 were conceived and / or identified by the scheme's Design and or EIA Teams, through consideration of potential alternative design elements, or mitigation for potential adverse impacts associated with the scheme.	Increased awareness and understanding of National Highway's ambition and commitment to the circular economy and their role in its realisation amongst the Design and wider project delivery team. Identification of opportunities for resource efficiency and the circular economy, informing preparation of contractual requirements for the ITPD and preparation of a list of opportunities to be used with this and other road schemes.
The scheme's CEEQUAL Assessor	The requirement within the Scope, for the scheme to aim for an 'Excellent' CEEQUAL rating provides a significant contractual requirement supporting sustainable resource management and the circular economy.	Delivery of the Resource Efficiency / Circular Economy Workshop and documentation through the Pathfinder Project stage 3-5 reports (National Highways, 2018, 2020 and 2021, unpublished) provided evidence, contributing to the scheme achieving a Client and Outline Design Award Assessment Preliminary Design stage CEEQUAL Assessment rating of 'Excellent'. The Pathfinder Project reports also supported the CEEQUAL final award assessment for the preliminary works during stage 5.
A303 Benefits Realisation Management (and Procurement)	The circular economy opportunities align with several National Highways' Benefits Realisation outcome themes and hence, existing scheme impact metrics.	Benefits Realisation Management facilitated the integration of circular economy outcomes into scheme design, leading preparation of contractual amendments to requirements for: energy efficiency; general environmental requirements; the Site Waste Management Plan and sustainable development within the ITPD during stages 3 and 4. Benefits Realisation Management supported the identification of the Linear Flow Index and Material Circularity Indicator as potential Benefits metrics, with the final decision being part of the preparation of the Full Business Case.

**Table 3** (continued)

Stakeholder(s)	Relevance to Circular Economy	Benefits arising from the Pathfinder Project
A303 Efficiencies	<p>The A303 Efficiencies Team is focussed on the identification, quantification, recording, validation, evidencing, reporting, and sharing of 'efficiencies' in support of National Highways' commitment to delivering the public 'value for money' [36].</p>	<p>28 of the resource efficiency / circular economy opportunities were considered to have potential as 'efficiencies' at the end stage 4. These were recorded for further investigation by the Efficiencies Team whose primary metric is financial performance against the Road Investment Strategy [36].</p> <p>25 circular economy opportunities remained on the Efficiency Register, as of November 2021. This included 4 new circular economy opportunities identified during stage 5 but excludes any potential efficiencies arising from the 6 additional opportunities identified during November 2021.</p>
Carbon Management	<p>Adoption of circular economy approaches, and opportunities is recognised as having a role to play in reducing greenhouse gas emissions associated with the scheme and hence, in achievement of National Highways' Net Zero Plan [34].</p>	<p>The circular economy opportunities are being reviewed by the scheme's Carbon Management Team during stage 5 to assess potential greenhouse gas emission reduction benefits with several opportunities taken forwards for further evaluation.</p>
Contractors		<p>Legal challenges to the DCO delayed engagement with contractors and this activity has not taken place at the time of writing.</p>



in new ideas and spreading awareness of the circular economy more widely than would have been the case with a ‘static’ project delivery team.

## **Influence and Opportunities**

National Highways recognises that ‘design has a fundamental role to play in achieving sustainable development. Decisions made by the designer will affect, the economy, the environment and society both now and in the future’ [21].

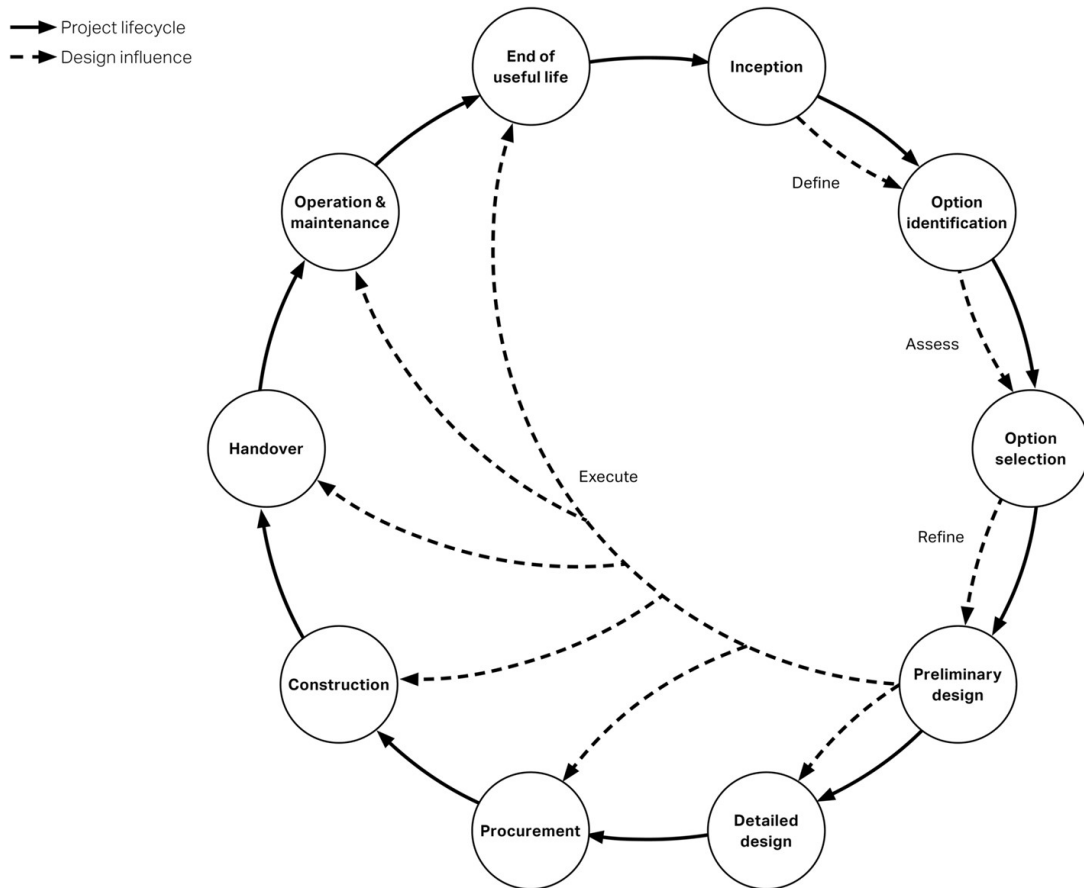
Design plays a critical role in the transition to the circular economy by influencing the way we consume, use and manage resources and products. It is widely accepted that, in general, influence decreases throughout project delivery. WRAP [38], for example, advises that ‘The best opportunities for improving materials resource efficiency in construction projects occur during the design stage. Implementing these opportunities can provide significant cost savings, reductions in waste produced and disposed to landfill, and carbon reductions.’ BS8001:2017 notes that, ‘It is widely believed that at least 80% of a product’s environmental impact is likely to be determined at the design stage, not just in designing and developing the physical product or end service, but when identifying and understanding problems and how to go about solving them.’ Fig. 2, redrawn from DMRB GG103 [21] shows the influence of design on road scheme project lifecycle, illustrating how the design stages influence subsequent project stages.

The A303 circular economy activities described in this paper began during PCF stage 3 (Preliminary Design), whereas the earlier A14 Pathfinder Project started during PCF stage 5 (Construction Preparation). The A303 Pathfinder Project sought to build upon experience gained through the A14, a key difference was that the initial approach to identification of opportunities was closely aligned with the CEEQUAL assessment criteria rather than the ReSOLVE framework previously used for the A14. This approach helped to integrate circular economy activities with an established element of scheme delivery and provided an early demonstrable ‘value’ to the Pathfinder Project, as a source of evidence for the scheme’s Preliminary Design stage CEEQUAL assessment. Use of CEEQUAL is consistent with the recognition of environmental / sustainability drivers as potential ‘cultural enablers’ for the circular economy in the built environment [10].

Focussed consideration of circular economy starting during stage 3 resulted in benefits including: increased awareness, identification and consideration of over 100 opportunities and provision of evidence for the scheme’s CEEQUAL assessment and is therefore considered preferable to starting at a later stage of scheme delivery. Further work is however, required to establish the benefits, if any, of overtly focussing on the circular economy during earlier PCF stages. PCF stage 0 (Options), for example, considered selection of the preferred corridor and development of route options within the preferred corridor [39] with potential circular economy implications such as retention and / or reuse of existing infrastructure addressed within National Highways’ existing approach.

The type and range of opportunities identified through the A303 Development Phase reflect National Highways’ pre-existing initiatives and commitments, including its focus on resource efficiency and natural capital as well as the wider Development Phase activities and outputs, most notably the EIA and associated environmental mitigation generated to support the application for DCO.

The potential opportunities for material, processes and environment / natural capital gains during PCF stages 3-5 were generally pre-existing initiatives or options identified and under consideration by the Design or EIA Teams rather than the result of the Pathfinder



**Fig. 2** Design and its influence on the project lifecycle

Project directly influencing the design. Very few of the opportunities identified are unique; instead, the circular economy approach applied was an extension of National Highways' existing practices such as resource efficiency, responsible and sustainable sourcing and seeking to reduce adverse environmental impacts. The key value of the Pathfinder Project activity was the overt application of a structured approach to the identification, consideration and where appropriate integration of opportunities. Adoption of this structured approach also helped identify and promote consideration of additional opportunities, that might otherwise have been overlooked.

Whilst it was useful, on a practical level to identify and filter potential opportunities on the basis of having an 'element of innovation' (i.e., not being 'standard mitigation') it was important to recognise, and communicate amongst stakeholders, that the opportunities do not have to be original to have value. As was the case for the earlier A14 Pathfinder Project, the majority of the opportunities identified to date are generic in nature and therefore potentially applicable to other road schemes.

Whilst design influence generally declines throughout scheme delivery, it is anticipated that additional opportunities will be identified, developed and implemented through future stages of the scheme, as other stakeholders, including contractors, are appointed and bring further innovation to scheme delivery.

## Identification of and collaboration with stakeholders - Integration of circular economy approaches into scheme delivery

Consistent with the Routemap [16], the Pathfinder Project sought to identify and work with existing elements of National Highways' corporate and project level management infrastructure, stakeholders, and activities to facilitate the integration of circular economy thinking into the delivery of this and other schemes.

Liaison with the internal stakeholders helped to make efficient use of project resources and also provided an immediate 'value' to Pathfinder Project reports and outputs beyond the Pathfinder Project itself. The Stage 3 Report (2018), was for example, used as evidence for the Preliminary Design stage CEEQUAL Assessment, which supported the Scheme's application for DCO.

Sharing the list of opportunities identified aspects of scheme design of interest to Benefits Realisation, Efficiencies and Carbon Management, widening recognition of the potential benefits associated with the circular economy as well as establishing mechanisms to allow benefits arising from the opportunities to be tracked, with impact quantified through future stages of scheme delivery.

### Procurement

The scheme's procurement process has aspects that align with and support key circular economy themes with 'Circular Economy' specifically identified in the Procurement Balanced Scorecard, Fig. 3. The Balanced Scorecard was used to convert the scheme's Client Scheme Requirements, and high-level National Highways' and Department for Transport objectives into key output objectives. This then informed the priorities of the Procurement Strategy and the weighting of the tender evaluation criteria [40].

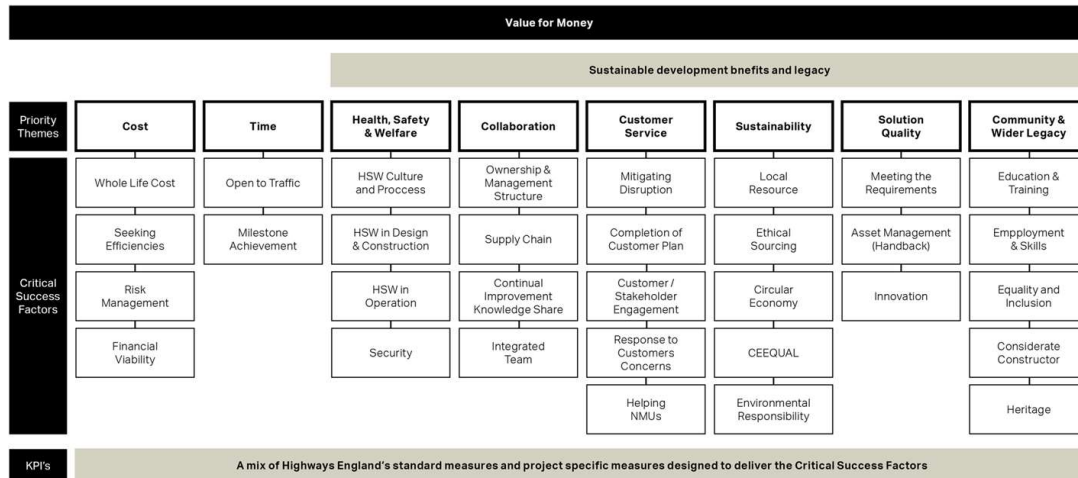
For the Main Works Contract, the Balanced Scorecard shaped the:

- i) Selection criteria used to determine the shortlist of bidders to receive the ITPD;
- ii) Tender evaluation criteria to establish the Most Economically Advantageous Tender;
- iii) Performance and payment incentives to manage the delivery of the main contract;
- iv) Scheme specific contractual terms; and
- v) Desired behaviours of the Contractor to achieve the scheme benefits stated in the Business Case.

The tender process for the Main Works Contractor commenced, during PCF stage 5, with the issue of an ITPD by National Highways to tenderers. An appendix to the ITPD provided a draft contract, with:

- A draft Scope including National Highways' requirements for the scheme;
- Reference to the DCO and associated requirements, including the OEMP; and
- Specific sustainability requirements, for example requirements focussed on greenhouse gas emissions, energy efficiency etc.

The successful Contractor must comply with all the requirements of the Scope. However, the Scope is largely outcome based, with the Preliminary Design (prepared for the DCO) informing the basic scheme requirements that the Contractor must comply with, but not forming a 'reference design'. This approach allows flexibility for the Contractor to



**Fig. 3** The National Highways Balanced Scorecard used for the A303 Amesbury to Berwick Down scheme

bring innovation in their approach to achieving the specified outcomes. The detailed design will be prepared following award of contract based on the solution committed to through the procurement process.

There is no formal financial incentive in the contract to incentivise contractors to specifically address the circular economy. Tenderers are, however, incentivised through the procurement model to adopt and optimise a whole life cost solution which could support some aspects of the circular economy.

The contract also includes clauses that support the circular economy by requiring the Contractor:

- i) in Providing the Works, to comply with National Highways' Sustainable Development Strategy and the circular economy vision and ambitions contained in the Strategy which is to put sustainable development into practice by '...encouraging economic growth while protecting the environment and improving safety and quality of life' [19];
- ii) to ensure that the National Highways' ambitions for a circular approach to the management of resources are reflected in the way in which material resources are sourced and managed (with a particular emphasis on maximising resource efficiency), re-used and re-utilised in as high a value function as possible); and
- iii) to work collaboratively with National Highways in completing the project's CEEQUAL assessment and aim to meet National Highways' aspiration to achieve a final award CEEQUAL rating of 'Excellent'.

The aspiration for the Scheme to achieve an 'Excellent' CEEQUAL rating is a key contractual factor supporting the circular economy. CEEQUAL is an evidence-based sustainability assessment, rating and awards scheme for civil engineering, infrastructure, landscaping and public realm projects [30]. A CEEQUAL 'Excellent' rating requires a minimum score of 75% through the CEEQUAL Assessment. Approximately 20% of the points available within CEEQUAL (v5.2) are associated with resource management; consequently, the outputs of the Resource Efficiency / Circular Economy Workshop were a significant element contributing to the scheme achieving an 'Excellent' rating for the Preliminary Design stage CEEQUAL Assessment.

## Assessing Project Impact

Whilst recognising the need to monitor progress, BS 8001:2017 [4] acknowledges that ‘there is no universally accepted approach to measuring organisational effectiveness in its transition to a more circular and sustainable mode of operation’. BSI also acknowledges that ‘no one method or metric is likely to fully capture how circular an organisation (or aspect of it) really is...’, but leaves it to organisations to ‘determine what success looks like...and how this is measured’.

Moraga et al. [41] suggest that a suit of indicators should be used to assess circular economy rather than a single indicator. Pauliuk [11] proposed a dashboard of indicators to be used with BS 8001:2017, suggesting that a closer link between BS 8001:2017 and established accounting and assessment tools for material flows and their environmental and social impacts is needed. Platform CB’23 [42] propose a ‘harmonised conceptual structure for a core measurement method’ for material related aspects of circularity for the Dutch construction sector, with the core measurement method focussed on impact indicators indicating the extent to which construction-related activity contributes to the goals of protecting stocks of materials, the quality of the environment, and existing value.

National Highways schemes are required to monitor, evaluate and report on the application of sustainable development and good road design throughout the design lifecycle [21]. National Highways’ Benefits Realisation Management approach provides ‘a common framework for benefits management and evaluation across all projects, programmes, and portfolios...’. Benefits Realisation Management aims to help schemes deliver the intended outcomes by focussing on the identified benefits and then ensuring that the solution (including the team structure) is designed and implemented to realise these benefits [43].

The A303 (Stonehenge) scheme has innovated within the field of Benefits Realisation Management and enhanced the visibility of circular economy initiatives. These have the potential to support a number of A303 scheme benefits, including: reducing the scheme’s cost and greenhouse gas emissions and increasing the proportion of reused or recycled material and renewable energy used, as well as avoiding environmental and ethical risks associated with the extraction and supply of primary materials through the maintenance of material value and the substitution of primary materials with re-used and repurposed products.

Potential approaches to monitoring Pathfinder Project impact on the built scheme include monitoring both ‘circular economy enablers’ (aspects that should encourage circular outcomes) and ‘circular economy outcomes’ [44].

During stages 3 and 4 of the scheme’s Development Phase, the number of ‘opportunities identified’ and ‘opportunities Incorporated into the Scheme’s DCO, Preliminary Design and / or OEMP’ were used as circular economy enabler indicators. It is however, recognised that these metrics are of limited value in assessing scheme outcomes as opportunities vary significantly in type and scale of potential impact.

The draft A303 Benefits Realisation Monitoring and Evaluation Plan addresses many aspects of scheme sustainability performance, including social, economic and environmental impacts - but not circularity of material use, but this is being revisited prior to the submission of the Full Business Case. Key considerations for any potential new metric(s) include the need to add value and complement existing metrics as well as practical considerations such as the associated data requirements.

The EMF’s Circular Indicators Project [45] sought to develop a way of measuring how effective a product or company is in making the transition from ‘linear’ to ‘circular’

models, developing Circularity Indicators suitable for use in product design. The Linear Flow Index (LFI) and Material Circularity Indicator (MCI) [46] use the source and quantity of material resources used; asset longevity, intensity of use and ‘end of life’ management to monitor how effective a product (i.e. the scheme) is in making the transition from linear to circular material use. Whilst it is acknowledged that reliance upon one or two indicators such as these for circular economy is potentially misleading, many other aspects of the circular economy are addressed by existing complementary indicators with the scheme’s Benefits Realisation Monitoring and Evaluation Plan.

Preliminary calculations indicate that the LFI and MCI calculations, being driven by the mass of materials, will be determined by a relatively small number of material types, such as: general fill, aggregate, sand, cement and asphalt, with other materials making a de minimis contribution. National Highways’ existing focus on the scheme’s ‘carbon impact’ [47] with supporting carbon model and contractual material source reporting requirements will generate much of the data required to monitor material resource efficiency and circularity of resource use via the LFI and MCI. It is anticipated that potential data gaps, including the amount and type of material reused within the scheme, can be quantified by reference to the scheme’s Building Information Modelling (BIM model) [48].

The A303 Benefits Realisation Monitoring and Evaluation Plan is considering the opportunity to include the LFI and MCI at the end of stage 5. It is expected that further work will be required to identify and address limitations imposed by the format and granularity of the available scheme data and other considerations such as utility and intensity of use to enable interpretation of results obtained, the metrics application to future road schemes and alignment with best practice in benchmarking [49]. It is however, hoped that successful application of the metrics will:

- allow monitoring of circularity of material resource use;
- provide a metric supporting recognition of investment in infrastructure durability / longevity;
- allow the A303 (Stonehenge) scheme to serve as a benchmark against which future schemes could be compared, or contractual clauses developed;
- support decision making (e.g., comparison of the performance of alternative designs) for this and future schemes; and
- help to embed circular economy approaches within scheme delivery of this and other future schemes.

## Conclusions and Limitations

The A303 Circular Economy Pathfinder Project has identified stakeholders and demonstrated mechanisms to integrate consideration and application of circular economy approaches into the scheme’s Development and future Construction Phases.

Development Phase benefits include increased awareness of the circular economy within the Design Team as well as the application of structured approach to the identification, consideration and where appropriate integration of circular economy opportunities. More than 100 potential opportunities have been identified and recorded, many of which are generic in nature and potentially applicable to other road schemes.

Mechanisms and metrics to monitor the management of material resources have been suggested for application via the scheme’s Benefits Realisation Management. Formal recognition of circular economy benefits as ‘intended scheme outcomes’ measured by the LFI

and MCI by Benefits Realisation Management would be a significant step in facilitating their future monitoring and realisation through scheme delivery.

Realisation and quantification of benefits associated with the circular economy initiatives and opportunities will require further work, including maintaining awareness and provision of technical support throughout subsequent stages of delivery.

The general approach developed, and opportunities identified through the Pathfinder Project are expected to influence the delivery of both the A303 (Stonehenge) scheme and other future National Highways' road schemes. National Highways is currently considering how the principles developed through the Pathfinder Project might be applicable to the third Road Investment Strategy (RIS3) pipeline, (the UK Government's aims and proposals for investment in the SRN from 2025 to 2030) [50] which also sits within the Complex Infrastructure Programme.

The key limitations associated with the Pathfinder Project approach described are considered to be:

i) The National Highways Pathfinder Project describes experience to date. The approach, including opportunities considered is expected to continue to be developed through the later stages of this scheme and the delivery of other road schemes.

ii) The paper describes the application of circular economy approaches by reference to National Highways' Major Project Cycle and applicable planning requirements. The general approach and outcomes achieved are however, expected to be broadly similar to, and therefore transferrable to other major infrastructure projects.

iii) The LFI and MCI metrics allow an absolute measure of the circularity of material resource management to be calculated and monitored for this and future road schemes. It is recognised that reliance upon one or two indicators to assess progress towards the circular economy is potentially misleading. However, other aspects of the circular economy such as biodiversity impact, use of non-renewable energy etc. are addressed by complementary indicators within the A303 Stonehenge scheme's Benefits Realisation Monitoring and Evaluation Plan.

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**Declarations** The views expressed in this paper are those of the authors and do not necessarily reflect those of National Highways. National Highways does not commit to apply any specific resource efficiency or circular economy opportunity to the A303 scheme.

**Competing interests** The authors are not aware of any competing interests.

**Authors' contributions** **D. Smith** was the Circular Economy Lead for the A303 (Stonehenge) scheme and led the conception, direction and delivery of the A303 Circular Economy Pathfinder Project including the preparation of this paper. **S. Baldrey** is the Environment Team Manager in National Highways' Operations East Division and contributed significantly to the identification and 'filtering' of circular economy opportunities identified. **C. Holm** is National Highways Senior Advisor in Sustainable Development and Climate Change and was the Pathfinder Project's 'internal champion' within National Highways. **E. Gordon-Smith** is the Benefits Realisation Lead for the A303 (Stonehenge) scheme and led the development of the Balanced Scorecard and integration of circular economy requirements through procurement. **W. Barrett** is the Operational Environment Lead for the A303 (Stonehenge) scheme and supported delivery of the Pathfinder Project within the context of leading direction and delivery of the scheme's Environment Statement.

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