ADEPT LUNCH & LEARN

RECYCOL – COLD IN-SITU RECYCLING

25TH NOVEMBER 2022

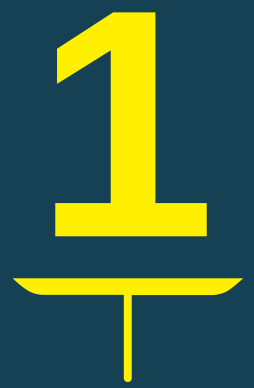
CELEBRATING 100 YEARS COLAS

ADEPT
Association of Directors of Environment, Economy, Planning & Transport

COLAS
WE OPEN THE WAY

AGENDA

1 INTRODUCTION
2 THE CARBON CONTEXT
3 SEVE – CARBON COMPARISON TOOL
4 UNIVERSITY OF NOTTINGHAM
5 TECHNICAL OVERVIEW
6 Q & A



INTRODUCTIONS

DAVID OGDEN

COLAS

ADEPT
Association of Directors of Environment, Economy, Planning & Transport

INTRODUCTIONS

DAVID OGDEN
UK Operations Director

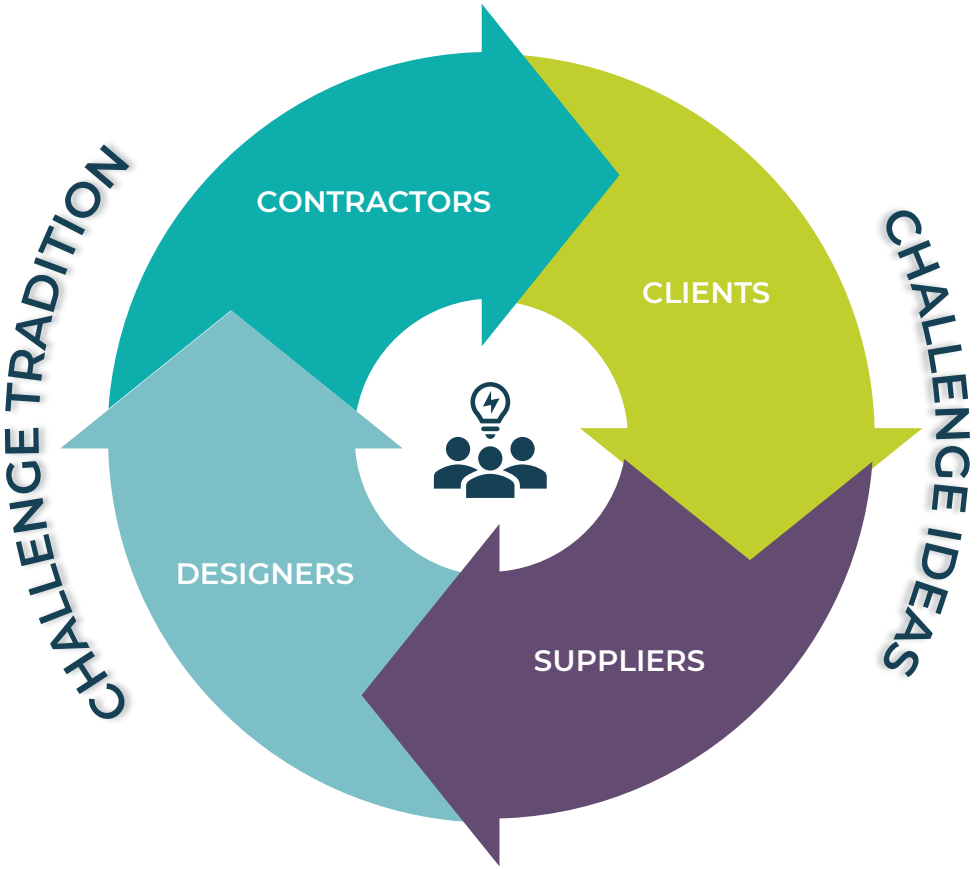
EMMA MURRAY
Environment Manager

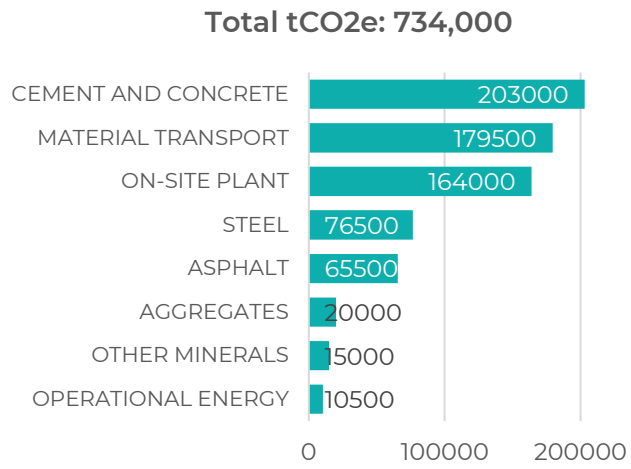
PAUL ACOCK
National Technical Manager

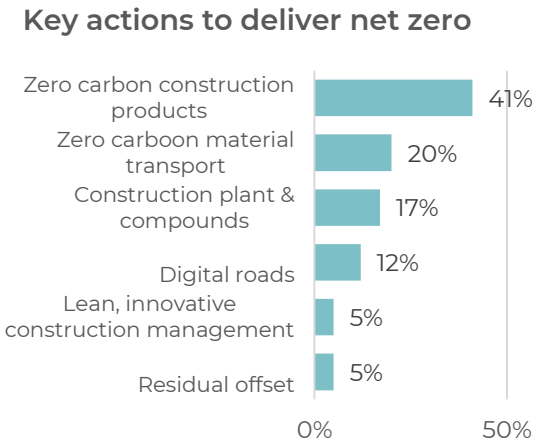
THE CARBON CONTEXT

EMMA MURRAY

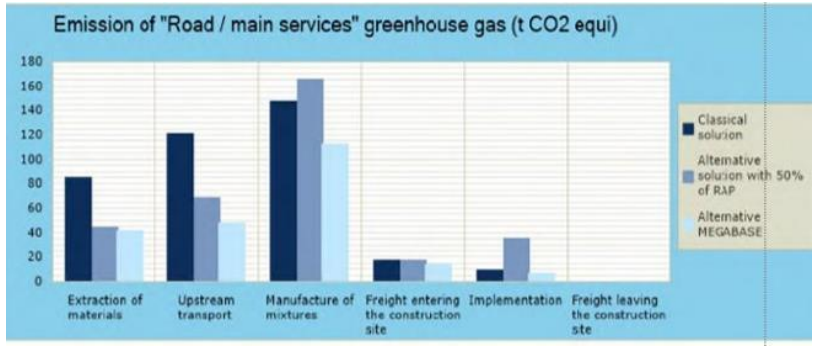
WHY ARE WE DOING THIS?







Structure	Binder	Aggregate	Upstream Transport	Manufacture	Downstream Transport	Laying	Retread Equipment	Total
Conventional	22.0	4.4	77.5	46.9	17.6	5.8	-	174.2
Retread	11.5	1.6	0.2	0.7	9.4	4.2	11.5	39.1



FUNDING - INDUSTRIAL ENERGY EFFICIENCY ACCELERATOR (IEEA)

- The BEIS IEEA programme is designed to accelerate the development and adoption of promising near-to-market innovations, by funding demonstration projects in an operational environment

- The £8 million of funding from BEIS is delivered by the Carbon Trust with support from Jacobs and KTN

- Recycol is an innovation project from Colas - in phase 2 of the IEEA

Department for Business, Energy & Industrial Strategy

CARBON TRUST

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SEVE – CARBON COMPARISON TOOL

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SEVE

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SEVE

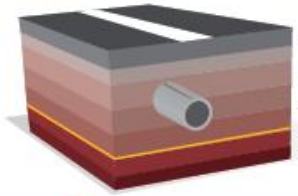
CALL TO TENDER

RAW MATERIALS | MANUFACTURING | TRANSPORTATION AND LAYING

SEVE® allows an environmental assessment of each phases of building and maintenance of your roads, earthworks and utilities networks with two specific modules.

ROAD & UTILITIES MODULE

EARTH-MOVING MODULE



- Surface layer (Wearing course, base course, tack coat)
- Road structure (Road base and subbase layers)
- Subgrade layer
- Earth moving upper part platform
- Earth moving upper part
- Excavated earth and backfill

SEVE® Eco-comparateur

7 QUANTITATIVE INDICATORS

2 DECLARATIVE INDICATORS

- Process energy (express in MJ)
- Green House Gas Emission (express in t eq co2)
- Preservation of the natural resource*
- Ton kilometer (express in t.km)
- Water
- Biodiversity

* Preservation of ressource included :

- Natural aggregates consumption (t)
- Reclaimed Asphalt Pavement consumption (t)
- Recycled Materials consumption (t)
- Excavated earth materials from the site and reused in the site (t)

RESULTS PROVIDED BY THE SEVE® SOFTWARE

Example of an indicator:

COMPARISON OF GHG EMISSIONS (in t eq CO_2)

Graph

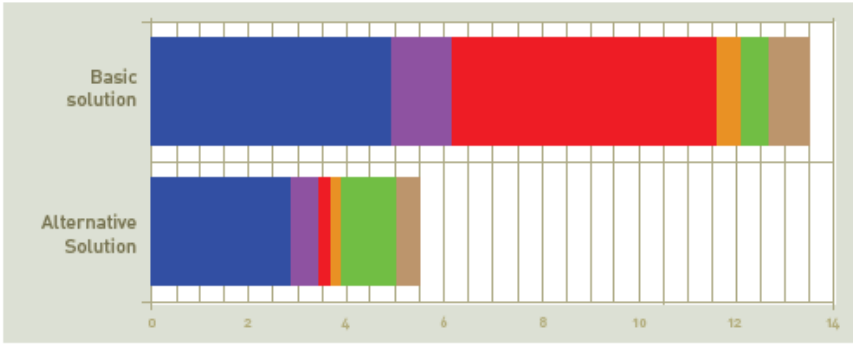


Table of results (in t eq CO_2)

Solution	Material extraction	Transport upstream	Manifacturing mixtures	Transport into the site	Laying	Transport outside the site	Total	ENVIRONMENTAL BENEFIT
Basic solution	5,0	1,2	5,5	0,5	0,5	1	13,7	60%
Alternative solution	2,9	0,6	0,2	0,3	1	0,5	5,5	

A DETAILED DOCUMENT, PDF FORMAT, PROVIDING:

- Identification of the project, the company, the owner and the contractor.
- General information about the software
- Summary presentation of the solutions
- Table of results (9 indicators)
- Detailed presentation of solutions
- List of used asphalt concrete formulas
- List of recycled materials

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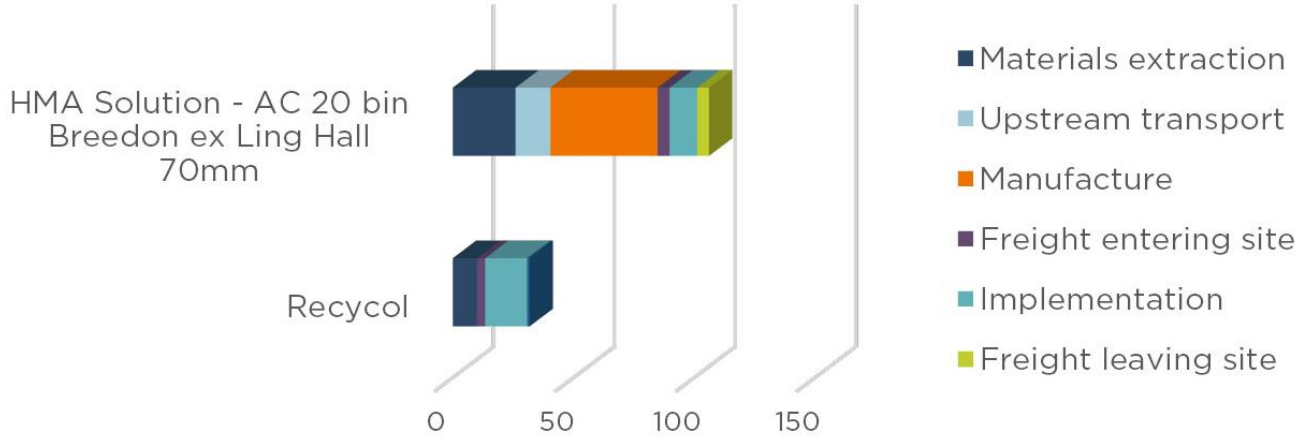
SEVE
RECYCOL

COMPARISON OF GHG EMISSION - ROAD / MAIN SERVICES (T CO_2 EQ)

	Materials extraction	Upstream Transport	Manufacture	Freight Entering Site	Implementation	Freight Leaving Site	Total
HMA Solution	26.0	14.4	44.4	5.0	11.4	4.9	106.1
Recycol	10.0	0	0	3.4	17.4	0	30.9



USING RECYCOL, TOTAL GREEN HOUSE GASES USED WAS A MASSIVE 70.9% SAVING COMPARED TO HMA SOLUTION

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UNIVERSITY OF NOTTINGHAM

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LOW CARBON HIGHWAY REGENERATION – RECYCOL

Key NTEC (UoN) Activities

- Perform role of ‘Independent Expert’ in terms of objective assessment
- Adaptation of existing performance prediction to include cold recycling (performance validation)
- Laboratory testing (following cold recycling pavement trial)
- Measuring and modelling actual performance and life expectancy (including future maintenance requirements)
- Measuring and modelling energy consumption, carbon footprint, etc
- Publishing of technical papers on the project

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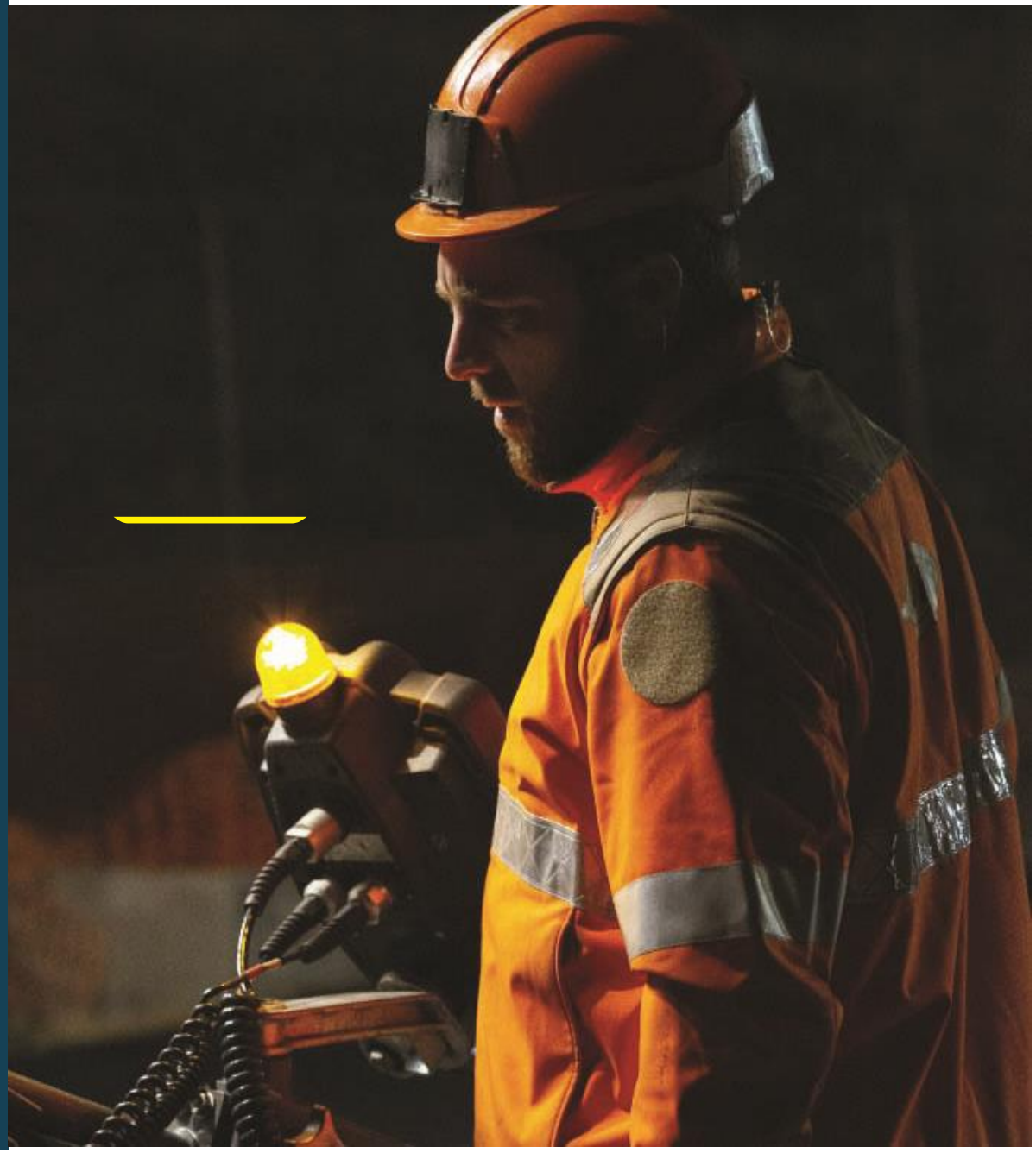
TECHNICAL OVERVIEW

AGENDA

- **COVENTRY CC SITES**
  - Beake Avenue
  - Lythalls Lane
  - Birmingham Road

- IN-SITU RECYCLING USING BITUMEN EMULSION
- RETREAD PROCESS
- RECYCOL PROCESS
- SITE ASSESSMENT
- MIX DESIGN
- RECYCOL PROCESS DESIGN
- TESTING PROTOCOL



RETREAD

SHALLOW IN-SITE RECYCLING

Retread is an in-situ recycling process which reconstructs the entire carriageway, the process regrades, reshapes and reconstitutes a deformed or deteriorated asphalt surface to produce a renewed surface, similar to a conventional asphalt.

It is a process that treats 75 mm to 85 mm of the existing construction. Extra thickness can be achieved by importing and incorporating additional material up to 125 mm.

In accordance with BS 9228:2021 – section 5

- Retread is (SVE) Slow Visco-Elastic
- Regen is (QVE) Quick Visco-Elastic

OVERVIEW - RETREAD

LOW CATEGORY RURAL ROADS

Typical surface condition of lower category roads that Retread is used to reprofile and seal

Retread sites, before and after treatments

RETREAD
PROCESS OVERVIEW

01 The existing surface is down-milled to a depth of 75mm (≤100mm) with intermittent rolling to allow the safe passage of traffic

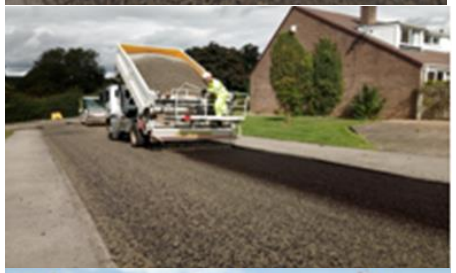
02 The material is then graded to form the new road profile

03 Retread emulsion is applied and harrowed to ensure maximum distribution and penetration of the emulsion into the loose material, followed by a vibrating roller

04 Finish: a second application of Retread emulsion is followed by 14mm chippings, followed by a double coat of Surfix 80s emulsion with 6mm chippings applied

05 A range of surfacing types can then be applied if required such as Micro surfacing or Fibredec.

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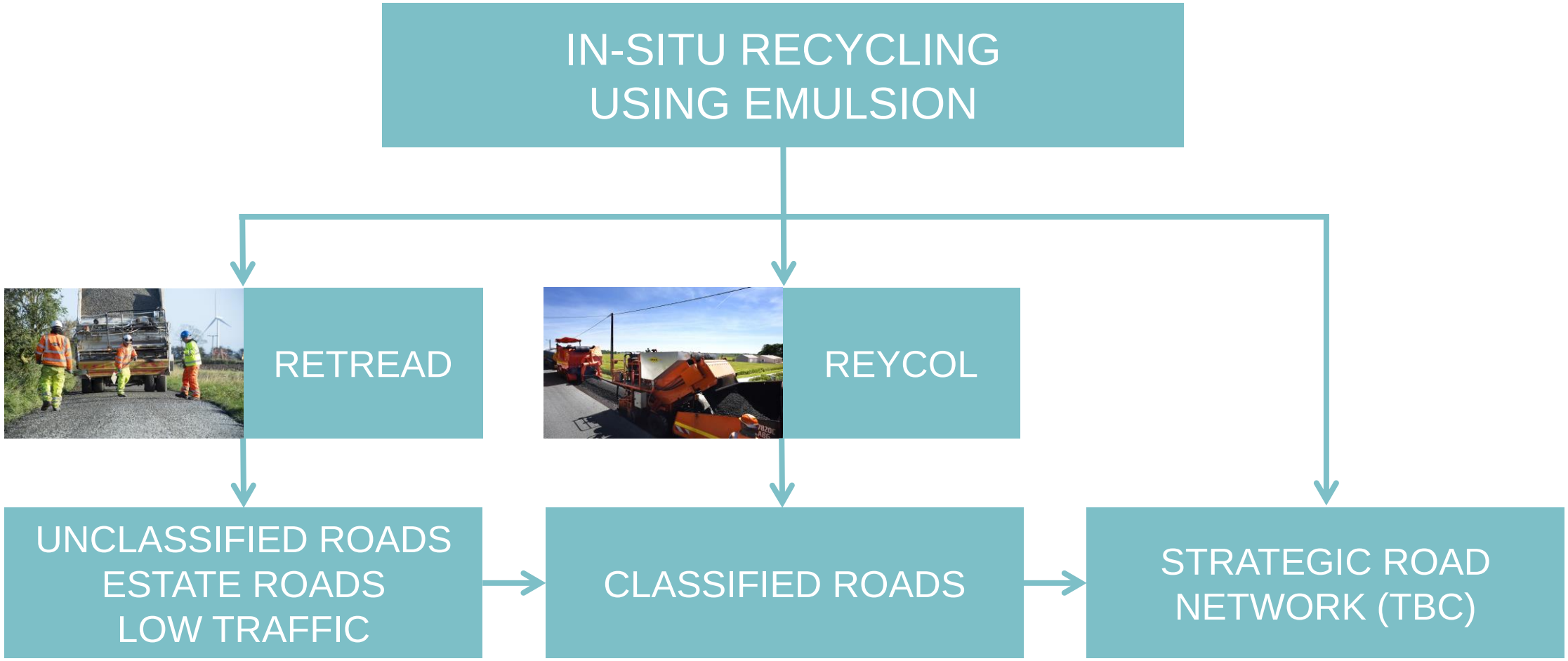
IN-SITU RECYCLING



RECYCOL SITE ASSESSMENT

PRE-TESTING ASSESSMENT

- Core Logging & sampling from each site. Pavement depth, material type, tar detection and/or binder aging properties
- FWD, carried out on existing carriageway before any activity to determine baseline data and PCI
- Mix Design evaluation on existing sampled material from each site
- Pavement Design based on Mix Design Data, site & Client data (traffic count…..)

ACTUAL RECYCOL TESTING

- During process – sampling of mixed material for further Laboratory study & testing, in-situ Density
- LWD Testing – to identify any possible soft spots
- Laboratory evaluation on site samples which will include PCG, ITSM, Wheel Tracking & Carbon Capture

POST RECYCOL TESTING

- Carbon data analysis on the process (Nottingham Uni)
- FWD Testing – to be carried out post activity to determine characteristic deflection data
- Coring on all three sites for laboratory evaluation study

CORE LOG

Core Log and QED Tar/binder condition from Beake Avenue

Material	Max Agg. Size (mm)	Comments	QED Identification
SMA	10		Deg.Bit.Binder 94.0%
Macadam	14		Bit.Binder 95.5%
Macadam	20		Bit.Binder (+/-17% Mobile Coal Tar) 98.6%

CORE LOG

COLAS UNITED KINGDOM

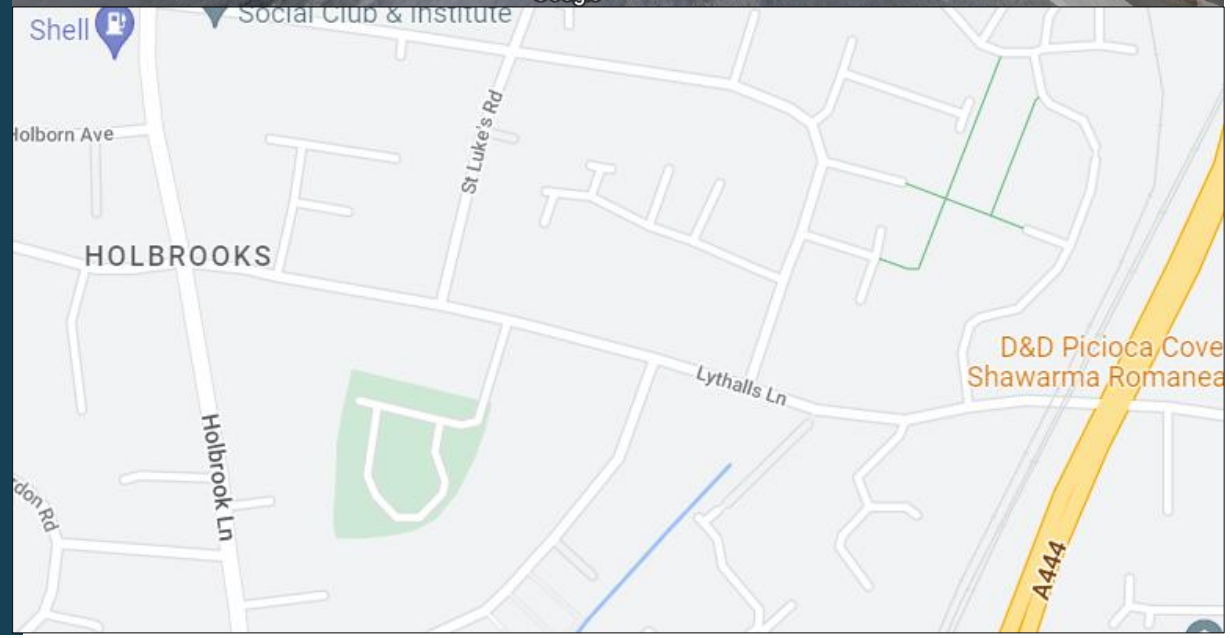
Project	Novacol Trial		
Date	6th July 2022		
Core Reference	BA#3	Job Reference	
Core Location	Beake Avenue, Coventry	Binder	

Layers						Comments	QED
No.	Top (mm)	Bottom (mm)	Thickness (mm)	Material	Max Agg. Size (mm)		Identification
1	0	36	36	SMA	10		Deg.Bit.Binder 94.0%
2	36	119	83	Macadam	14		Bit.Binder 95.5%
3	119	228	109	Macadam	20		Bit.Binder (+/-17% Mobile Coal Tar) 98.6%
4							
5							
6							
7							
8							

Bit.Binder Bitumen Binder
Deg.Bit.Binder Degraded Bitumen Binder
V.Deg.Bit.Binder Very Degraded Bitumen Binder

SCHEME SPECIFICS

- LOCATIONS SELECTED ARE:
  - BEAKE AVENUE - 6500 M2
  - LYTHALLS LANE - 3913 M2
  - BIRMINGHAM ROAD - 2100 M2
- OUR WORKS INCLUDE: MILLING THE EXISTING SURFACE, AND MIXING THE MATERIAL WITH EMULSION & WATER. THIS MATERIAL IS THEN FED BY A LIFTER INTO THE HOPPER OF A TRADITIONAL PAVER & LAID AS BINDER COURSE.
- ONCE THE BINDER HAS BEEN LAID AND COMPACTED BY DEADWEIGHT & PTR, A SINGLE COURSE SURFACE DRESSING LAYER IS LAID USING 10MM CLEAN WASHED AGGREGATE ON HOT APPLIED EMULSION. THIS WILL GIVE THE ROAD USERS A RUNNING SURFACE.



RECYCOL

SCOPE:

- CARRIAGEWAY REINFORCEMENT / TRAFFIC VOLUMES

TECHNICAL COMBINATION:

- 10MM SMA SURFACE COURSE

DEPTH OF RECYCLING:

- PLAIN OUT EXISTING SURFACE COURSE

  70 TO 80 MM FROM BINDER COURSE LEVEL

DESIGN MIX PROCEDURE

LABORATORY TESTS ACCORDANCE TO SETRA
"In situ Cold recycling of old pavements" - 2003 Class III

CURING CONDITIONS OF THE TEST SAMPLES

DURIEZ / ITSM

PCG

- @100 Gyrations 13.7% (<25%)

Recovered Binder

- Pen – 26 dmm
- Spt – 65.7°C

Regenerated Binder

- Pen – 39 dmm
- Spt – 59.3°C

DURIEZ

- 7 days @ 18°C 50% HR for all samples + 7 days at 18°C 50% HR (dry curing) or 7 days at 18°C 50% HR (wet curing)

ITSM 124ms

- 14 days @ 35°C 20% HR

- % voids 6% (<14%)
- r/R 0.74 (>0.7)

- % voids 17.6%

(80 Gyrations)

- 15°C 3033
- 20°C 1974

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PAVEMENT DESIGN ALIZE

TRAFFIC COUNT → FWD → PAVEMENT LIFE

Traffic Count

- 380 standard axles of 8 t per day

Material Stiffness (MPa)

50th Percentile	15th Percentile
Asphalt 7803	Asphalt 5263
Unbound 198	Unbound 172

50th Percentile	15th Percentile
Asphalt 841	Asphalt 770
Unbound 115	Unbound 87

Service Life

>15 years on sections

7-12 years on sections

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Q&A / DISCUSSION