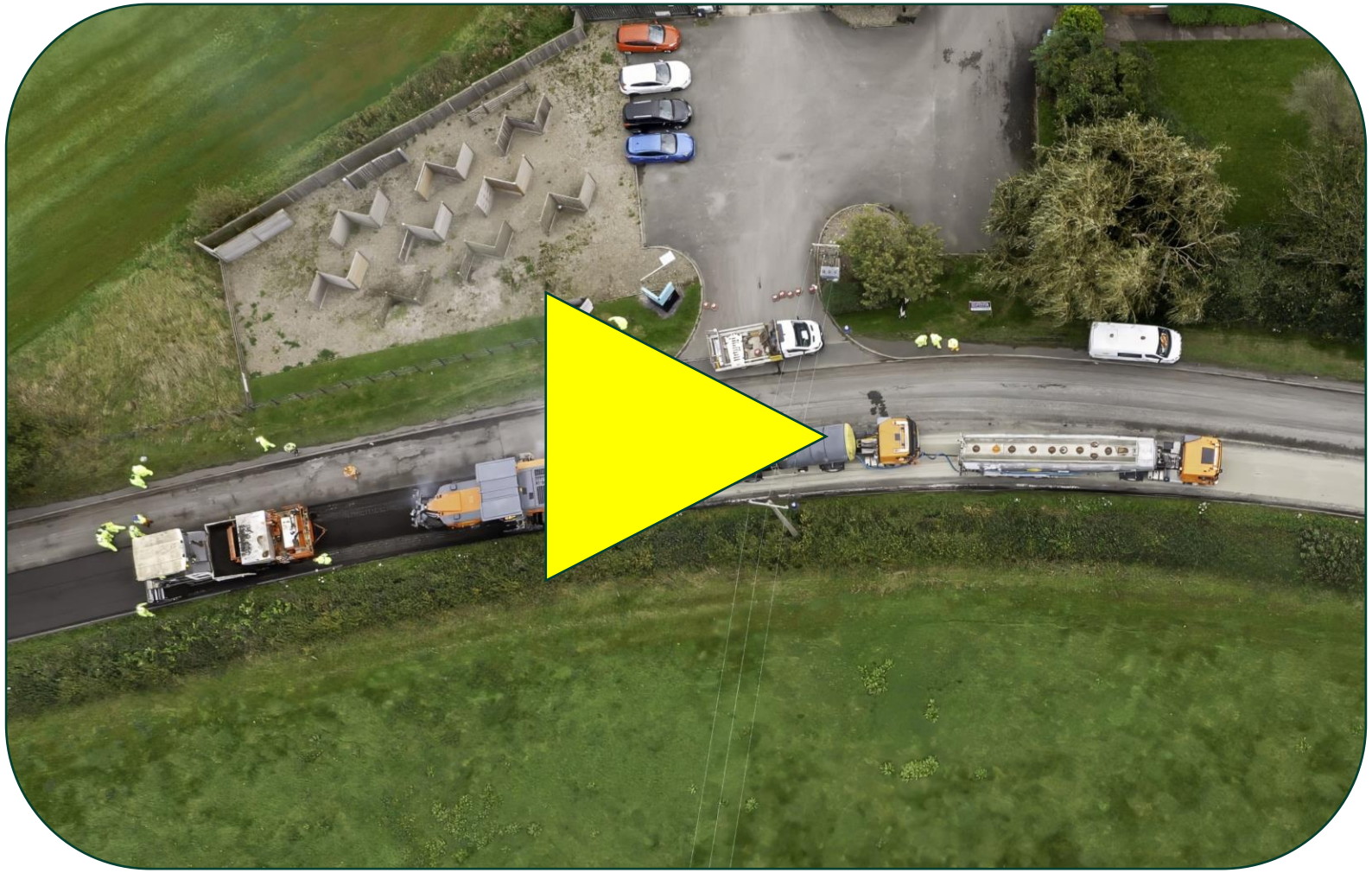
RECYCOL A41 DELIVERY

LOW CARBON HIGHWAY REGENERATION

COLAS



CARRIAGEWAY RECYCLING

In-Situ Recycling

- Single pass road train, Minimal HGV movements,
- 100% RAP, Different formulations for different road types
- Low scale but maximises carbon reduction - 65-80%

Ex-Situ

- A centralised Recycling hub, which serves the whole county
- 100% RAP – All excavated material comes to the hub
- Widescale and good carbon Reduction - 40-50%

1

COLAS LTD

PRESENTERS

PAUL ACOCK
National Technical Manager

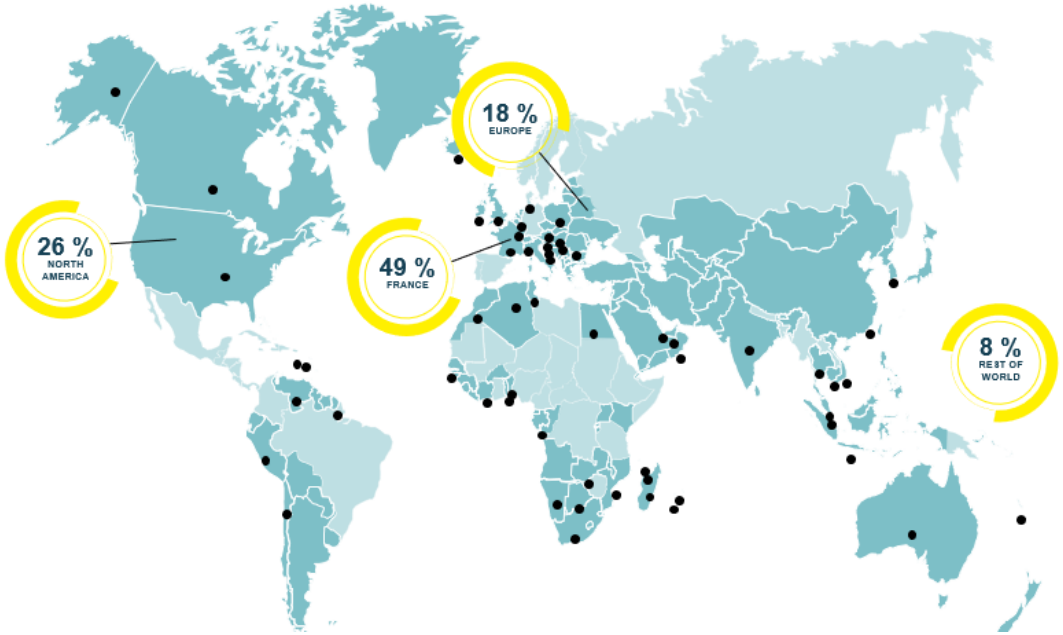
JOE KIMBERLEY
Innovation Manager

EMMA MURRAY
Environment Manager

COLAS GROUP

GLOBAL PRESENCE IN OVER 50 COUNTRIES ON 5 CONTINENTS

52% INTERNATIONAL



OUR GLOBAL ACTIVITIES

ROADS

AIRFIELDS

MATERIALS

RAIL

PORTS

SPAC

REVENUE

12.3

BILLION EUROS

END OF 2020

EMPLOYEES

57

THOUSAND

GLOBALLY

PROJECTS

110

THOUSAND

COMPLETED IN 2020

#1

ASPHALT PRODUCER

COLAS GLOBAL INFRASTRUCTURE

DENSE INTERNATIONAL NETWORK OF PRODUCTION, STORAGE & RECYCLING UNITS

518 asphalt plants

463 quarries and gravel pits (in operation)

174 concrete plants

147 emulsion plants

420 recycling units

1 bitumen refinery located in Kemaman, Malaysia

71 bitumen storage terminals

COLAS UK

CSR STRATEGY

Shape an **exemplary culture** of **ethics** and **compliance**

Offer our **customers and users** solutions that meet the challenges of **sustainable development** in local communities

Build a **responsible supply chain** rooted in **sustainable performance**

Roll out a **low carbon** and **biodiversity** strategy to **preserve the planet**

Foster a stronger **health and safety culture** to **protect lives**

Promote **circular economy** solutions to preserve **natural resources**

Attract, develop and retain talent through **managerial excellence**

Reduce the **impact** of our activities to bolster **acceptability**

LOW CARBON AND BIODIVERSITY ROADMAP

6 axis

29 commitments

20 KPIs

Axis 1

Integrating climate change issues into our Group strategy

EX: new lines of business, Climate Fresk

Axis 2	Axis 3	Axis 4	Axis 5	Axis 6
Reduce the carbon intensity of our direct emissions	**Develop and promote low-carbon solutions**	**Optimize our carbon accounting of activities**	**Reduce our clients/users emissions**	**Promote biodiversity into our activities**
Electrical vehicles Green hydrogen	**Low carbon concrete Recycol**	**Worksite carbon calculator**	**Mobility by Colas**	**Hedge plantations**

2

DECARBONISING THE ROAD NETWORK

CHALLENGING THE EMERGING TRENDS

Cradle to Gate evaluations – (Global values)

		Current	Target	Variation	Qty	impact	
						unit	total
Increase warm mix %	30°C reduction	15,6%	50,0%	34%	12 900 000	2,7	34 830
Control of warm mix temperature	10°C reduction			16%	5 850 000	0,9	5 265
Control of hot mix temperature	10°C reduction			50%	18 750 000	0,9	16 875
Increase RAP	Same W%	16,0%	30,0%	14%	37 500 000	0,17	89 250
Reduce material moisture content				-0.7%	37 500 000	1,96	53 802
					Total impact		**200 022**

	Kg CO2/t	t CO2
Current carbon footprint	32,5	1 218 750
Target carbon footprint	27,2	1 018 728
Potential savings	-16,4%	

		CURRENT		TARGET	
Aggregates		1%	50%	1%	42%
Sand		3%	34%	2%	28%
RAP		5%	16%	2%	30%
	Average W%		2,3%		1,6%

Reference quantity
37,500,000
Tons of asphalt mix

All those efforts will represent

of the reduction target

RAP – RECYCLED ASPHALT (AGGREGATE) PLANINGS

Asphalt is 100% recyclable at its end of life and can be incorporated back into new asphalt.

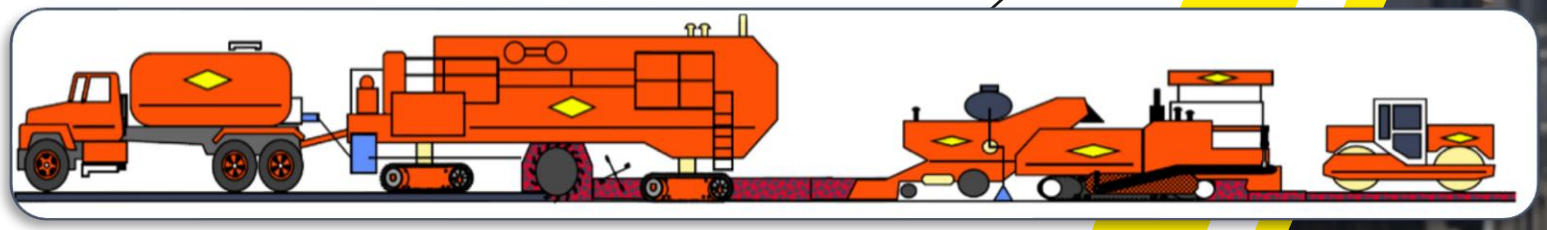
Using these recycled asphalt planings (RAP) in the asphalt production process avoids using virgin aggregates, protecting natural resources for future generations.

Types of RAP can include:

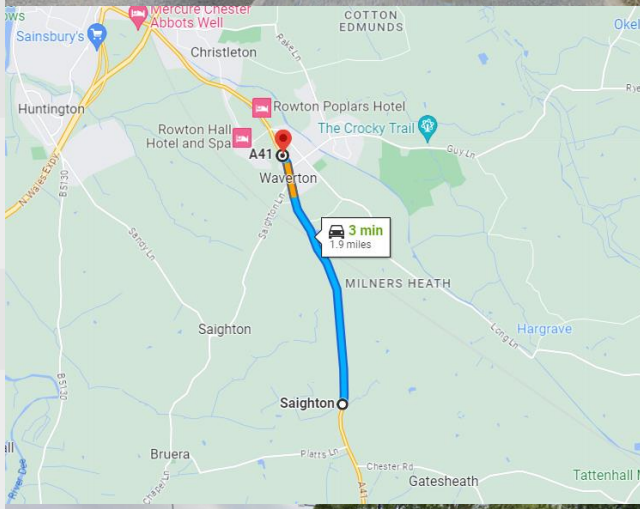
- Asphalt Planings
- Recycled Aggregate – rail ballast
- Crushed Concrete
- Crushed Brick

RECYCOL

- Recycling 100% of the binder course, cold and in-situ
- Emulsion based – flexible binder course
- With cement for accelerated curing + additional rigidity
- Typically ~70% carbon saving – Cheshire ~65% saving
- 20+ years of experience in France

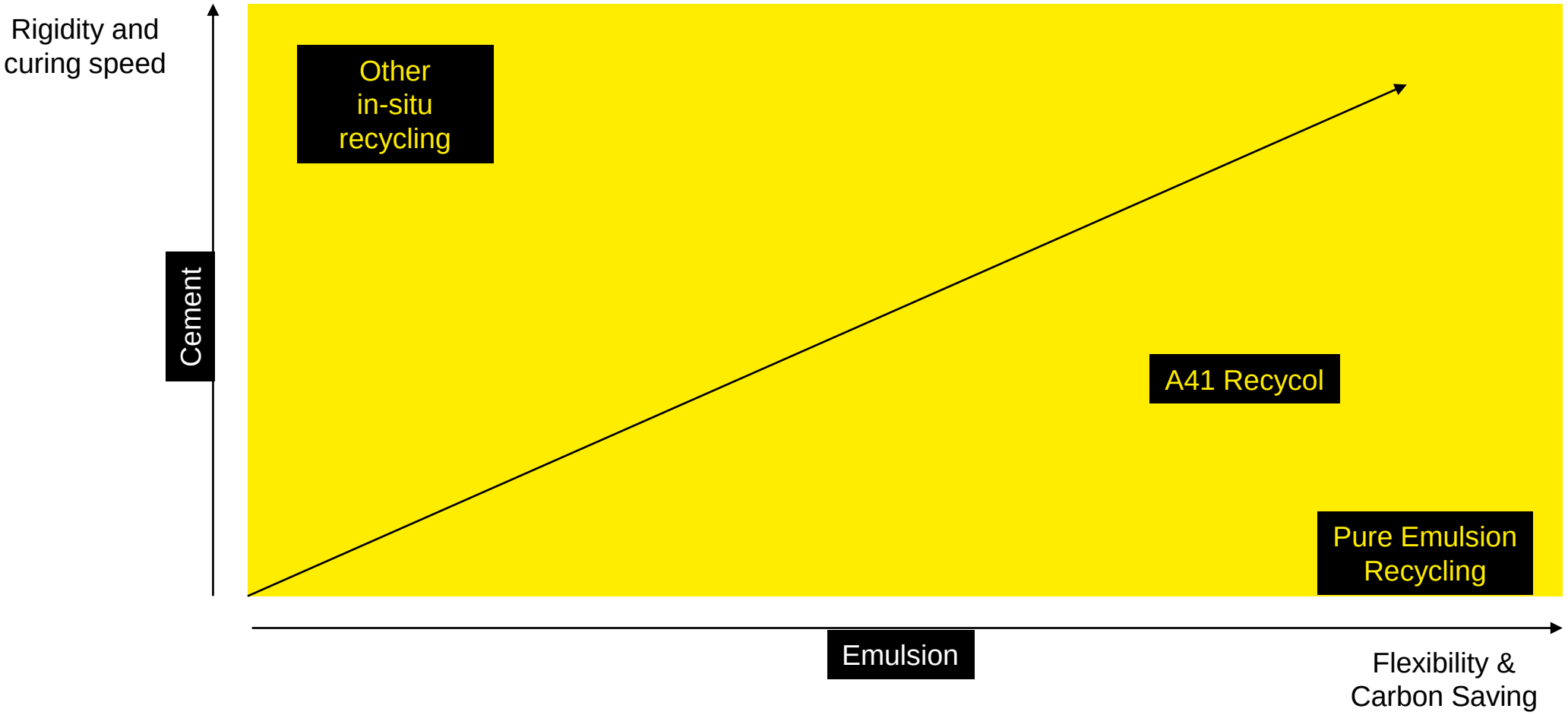


A41 CHESHIRE WEST



- **A41 RESURFACING IN 2023**
  - 2km of the A41 - 5 days full road closure - 3rd October - 7th October
- **PROCESS STEPS:**
  - Surface course removal - depth 40mm
  - Binder Course Recycling @100% - depth 70mm
  - Surface course relaid as SMA - depth 40mm
- **EVALUATION –**
  - Falling Weight Deflectometer, core samples, pavement and mix designs, Life-cycle Analysis carbon evaluation

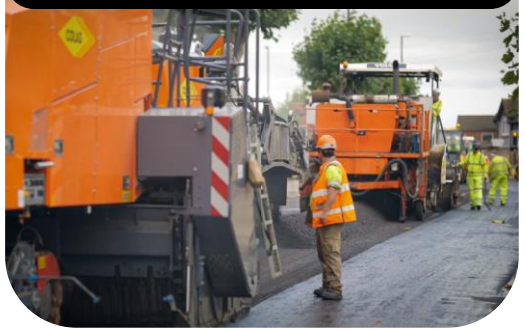
EMULSION VS CEMENT



RECYCOL ROUTE MAP

2000
>20 YEARS RECYCLING IN FRANCE

2022
UK URBAN ROAD COVENTRY



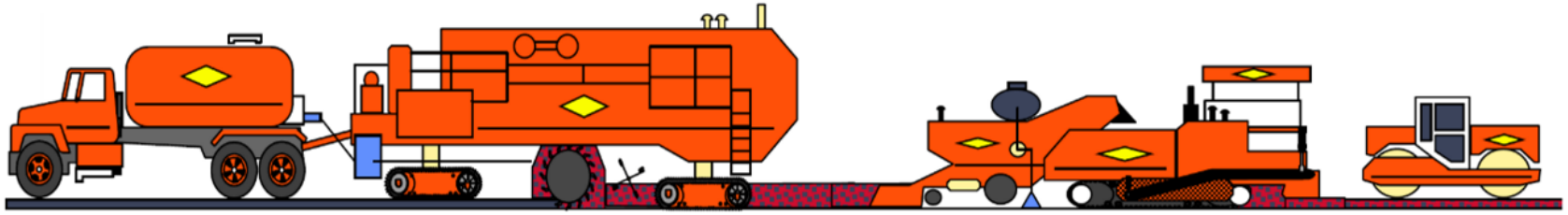
2023
LOCAL MAJOR ROAD

2024
NH & STRATEGIC ROAD NETWORK

INDEPENDENT EVALUATION

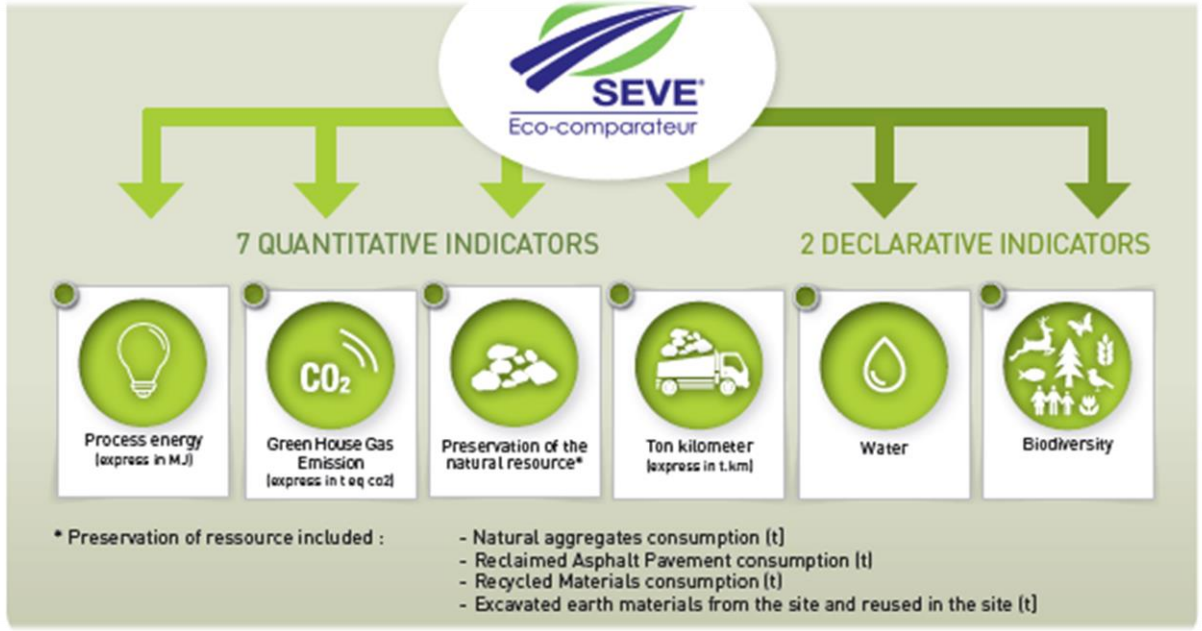
Department for Energy Security & Net Zero

CARBON TRUST



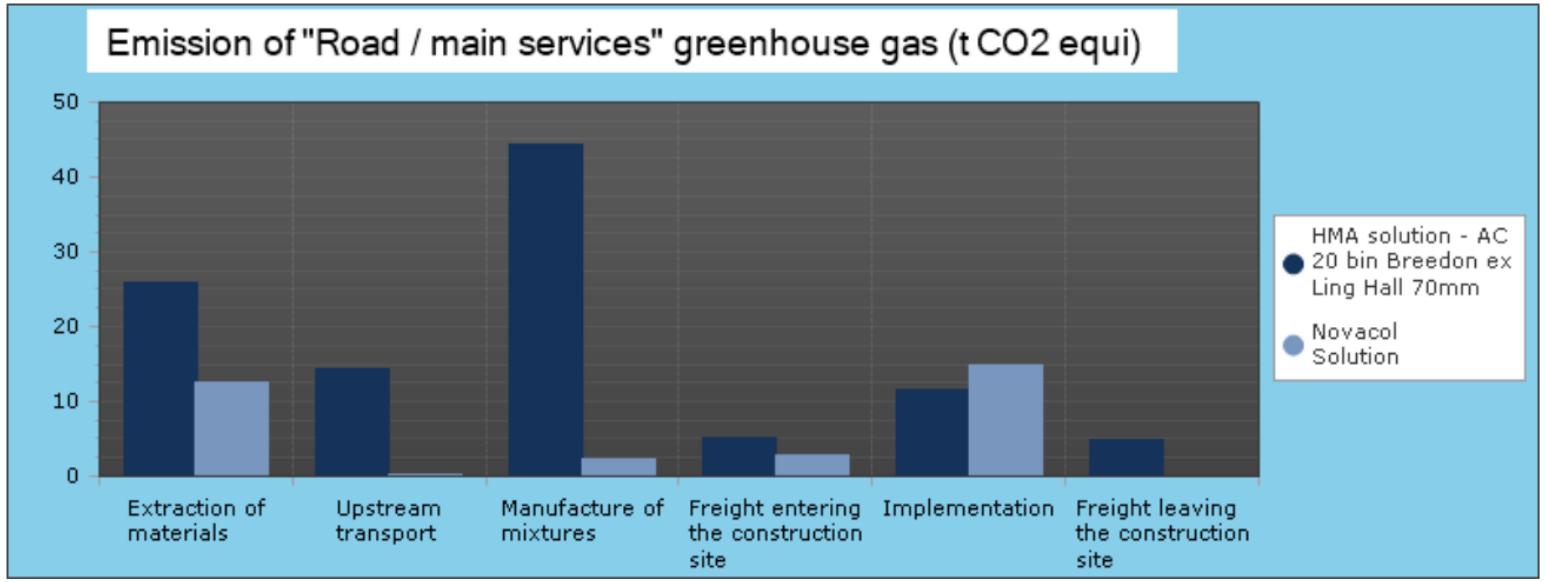
The University of Nottingham

SEVE ECO-COMPARATOR TOOL



RECYCOL CARBON EVALUATION

		Emissions of greenhouse gases (t CO2 eq)							
		Materials extraction	Upstream transportation	Manufacture of mixtures	Freight entering the site	Implementation	Freight leaving the site	Total	Comparison / Base
HMA solution - AC 20 bin Breedon ex Ling Hall 70mm	Roads and Networks	26,0	14,4	44,4	5,0	11,4	4,9	**106,1**	
Novacol Solution	Roads and Networks	12,6	0,5	2,3	2,7	14,9	0,0	**33,0**	**-68,9 %**



BENEFITS

CARBON REDUCTION
~ 70% carbon saving vs HMA (as measured in SEVE)

SHORTER PROGRAMMES
Shorter delivery programme due to single pass binder replacement

TAR BOUND ASPHALT
Re-encapsulation of tar bound material back into the asphalt reduces risks to workers

FEWER HGV'S
- Traffic disruption
- Improved safety
- Noise reduction
- Air quality

IMPROVED SAFETY
Low temperature mixing improved safety, odour and air quality

STANDARDS FOR HIGHWAYS WORKS

EXISTING STANDARDS

SHW 947 - In situ cold recycled bitumen bound material

SHW 948 - Ex situ cold recycled bitumen bound material

INCOMING PROPOSALS FOR 2024

SHW 949 – In-situ Recycling (Down Cut process)

947 (05/18) **In Situ Cold Recycled Bitumen Bound Material**

(05/18) **Scope**

1 (05/18) In situ cold recycled bitumen bound material shall be designed and produced to form the foundation or main structural layer of the road pavement. The primary aggregate source shall be obtained by cold pulverisation of all, or part, of the existing road structure. The primary binder (stabilising agent) shall be a foamed bitumen, with cement or lime as an adhesion agent. The aggregate grading may be adjusted by the addition of a filler. Lime may also be used to modify any cohesive sub-grade soil incorporated in the pulverised layer.

2 (05/18) Prior to commencing the pulverisation and stabilisation works, the Contractor shall demonstrate, to the satisfaction of the Overseeing Organisation, using the results of mix design procedures described in sub-Clauses 58 to 65 of this Clause, that the existing pavement materials in the sections of the works defined in contract specific Appendix 7/18 are capable of being recycled by pulverisation to form the primary aggregate component of an in situ cold recycled bitumen bound material which can meet the specified end-product performance requirements.

(05/18) **Component Materials**

(05/18) **Aggregates and Fillers**

3 (05/18) The pulverised pavement material and any supplementary aggregate and/or filler shall normally be granular material with not less than 5% and not more than 20% passing the 0.063 mm sieve (Zone A graded material). Approval for use of pulverised granular material containing up to 35% passing the 0.063 mm sieve (Zone B graded material) shall require confirmation by the Overseeing Organisation, subject to the results of the mixture design procedures described in sub-Clauses 58 to 65 of this Clause.

4 (05/18) The pulverised granular material shall contain not more than 2% of organic matter as determined in accordance with BS 1377-3 clause 3.

(05/18) **Bitumen Binder**

5 (05/18) The primary binder shall be foamed bitumen. The base bitumen shall comply with BS EN 12591 and shall be 100/150 penetration grade.

6 (05/18) Other than foaming agent(s), bitumen modifiers shall not be used unless approved by the Overseeing Organisation for special purposes or conditions.

IN-SITU RECYCLING

IN-SITU RECYCLING
USING EMULSION

RETREAD

REYCOL

UNCLASSIFIED ROADS
ESTATE ROADS
LOW TRAFFIC

CLASSIFIED ROADS

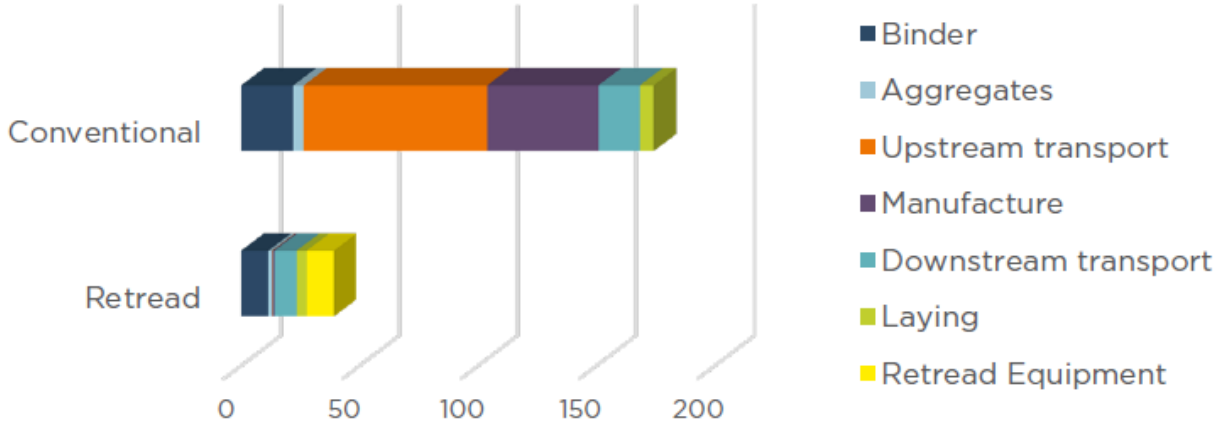
STRATEGIC ROAD
NETWORK (2024)

RETREAD - LOW CATEGORY RURAL ROADS

Retread sites before & after treatment

RETREAD – CO2 EVALUATION

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



USING RETREAD, TOTAL GREEN HOUSE GASES USED WAS A 77.37% SAVING COMPARED TO CONVENTIONAL SURFACING

MEGABASE – RECYCLED AGGREGATES

Characteristics *(usual values)*	MÉGABASE® 0/31.5 mm 0/40 mm
Gyratory Shear Press Test (NF EN 12 697-31) Maximum voids at 120 gyrations, in %	9.0
Duriez Test (NF EN 12 697-12) Water sensitivity (immersion/Compression), in %	≥ 75
Rutting Test (NF EN 12 697-22) (Large Model, 60°C) Ruts at 30 000 cycles, in % Ruts at 100 000 cycles, in %	≤ 6.5 ≤ 7.5
Complex Modulus Test 15°C, 10Hz (NF EN 12 697-62) E , in MPa	≥ 11 000
Reversed Bending Fatigue Test 10°C, 15 Hz (NF EN 12 697-24) ε_6, in µstrain	≥ 100

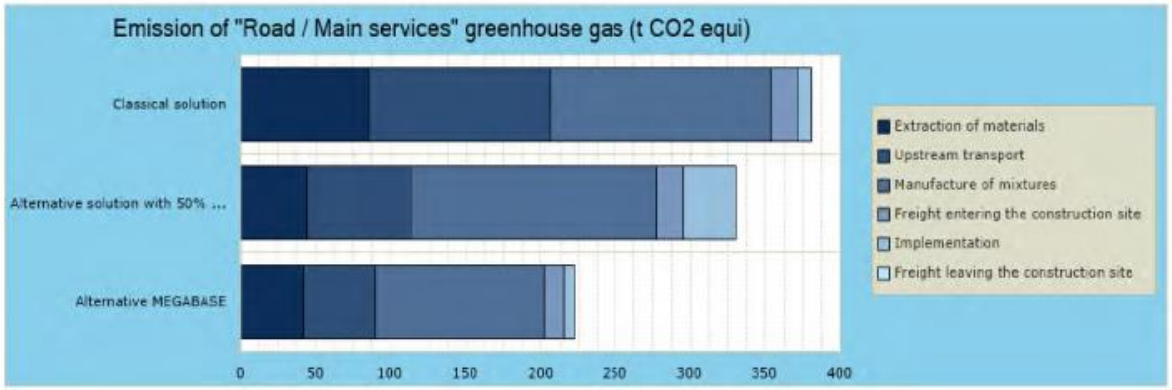
Megabase® Strong granular framework using reclaimed rail ballast

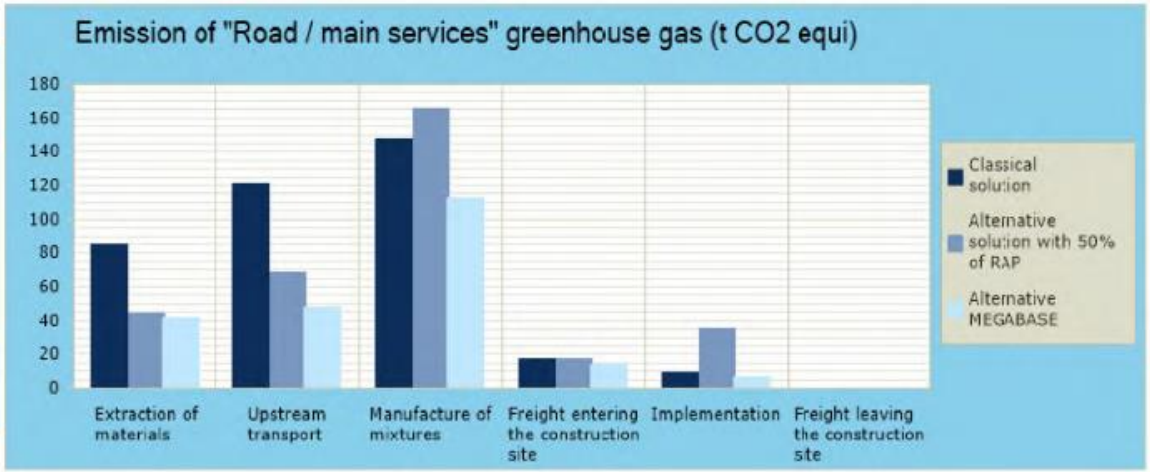
- High mechanical performance - Dedicated to areas with extreme loads (ports, bus stops, intermodal platform, industrial sites)
- Economical asphalt mix
- Low carbon

Basic solution	Alternative solution
360 mm AC 32 50 MPa	265 mm MEGABASE 50 MPa
265 mm AC 32 50 MPa	190 mm MEGABASE 50 MPa
200 mm AC 32 50 MPa	140 mm MEGABASE 50 MPa
165 mm AC 32 50 MPa	110 mm MEGABASE 50 MPa

MEGABASE – CO2 EVALUATION

		Emissions of greenhouse gases (t CO2 eq)							
		Materials extraction	Upstream transportation	Manufacture of mixtures	Freight entering the site	Implementation	Freight leaving the site	Total	Comparison / Base
Classical solution	Roads and Networks	85,0	121,1	147,3	18,0	9,4	0,0	**380,8**	
Alternative solution with 50% of RAP	Roads and Networks	44,5	68,2	164,8	18,0	35,2	0,0	**330,7**	**-13,1 %**
Alternative MEGABASE	Roads and Networks	42,0	47,6	112,2	13,6	6,7	0,0	**222,2**	**-41,7 %**





DECARBONISATION – OUR INTERNATIONAL APPROACH

An industry Leader on Sustainable Road Solutions

- **World's 5th biggest Recycler**
- **Valorcol**
- **Vegecol**
- **Wattway**
- **Eco5**
- **Asset Management**
- **Mobility**
- **Working with industry boards – Live Labs etc**




FINAL WORD

- A growing market
- A range of solutions – different blends
- A blend of In-situ and Ex-situ
- Any Questions?