The new SHW and updated DMRB

18th February 2025

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Contents

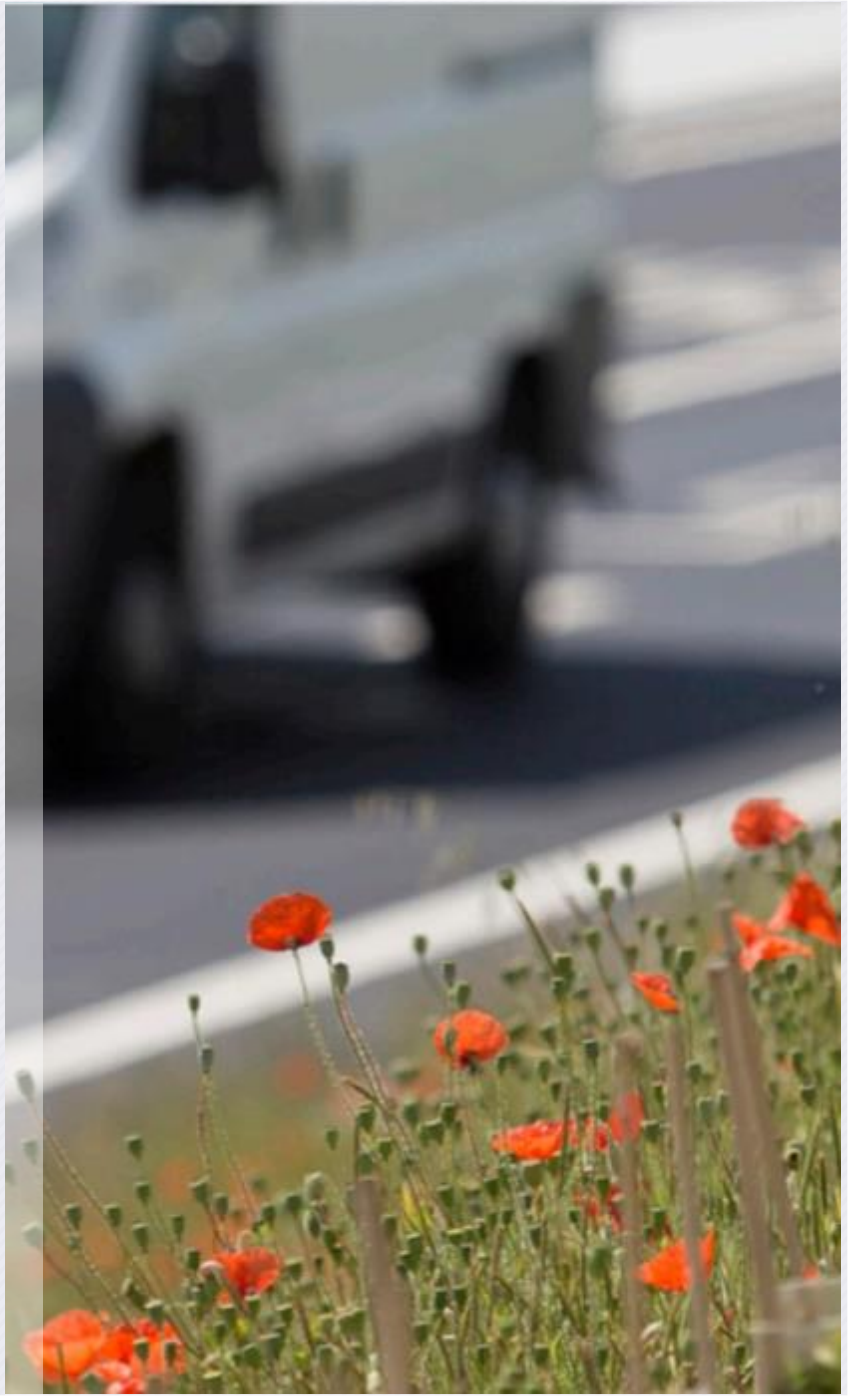
SHW rewrite

The SHW has had the same format for over 30 years.

Following an industry consultation, National Highways committed in RIS2 (2020 – 2025), to updating the SHW to create a suite of clear, unambiguous and user-oriented digitally-enabled documents that met the needs of modern contacts and projects.

Big bang publication date is **2025** of the new specification and associated DMRB updates.

https://www.standardsforhighways.co.uk/help?tab=mchw

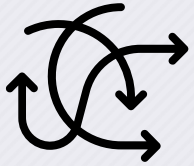


Why the MCHW is being updated

Technical Regulations Protocol obligation

“Develop and deliver a work programme to refresh the MCHW during the second Road Period so that it reflects the needs of its users. This refresh should take account of the stakeholder consultation, including that with the Strategic Design Panel, undertaken in RIS1”

14 years average age, some over **30 years**



Inconsistent format of existing documents

Support a digital future

Distinguish design requirements and constructor requirements

Support contract flexibility

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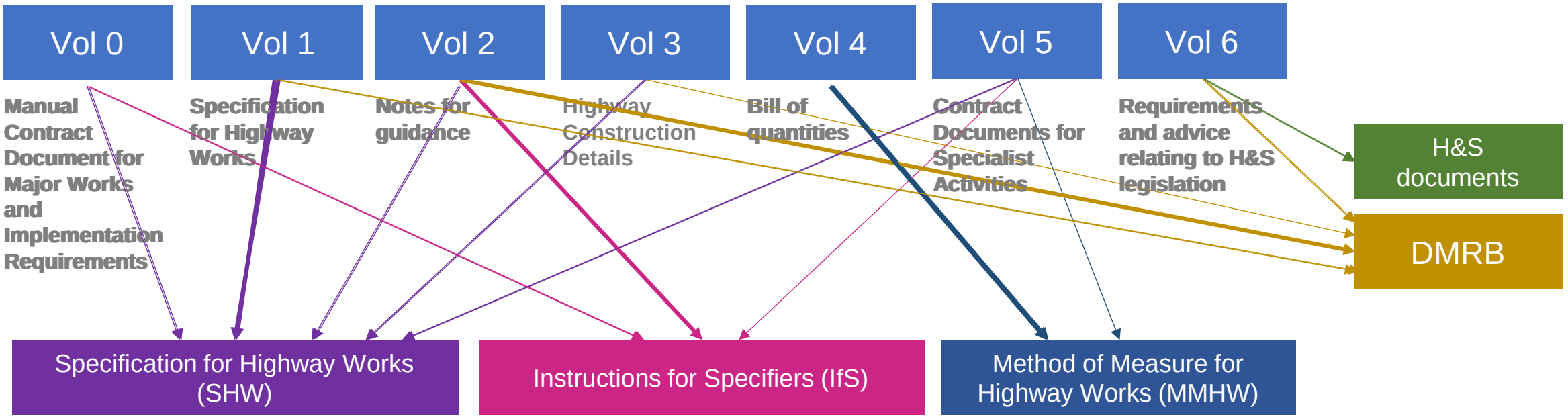
MCHW current state but will be Archived content



Clear and unambiguous requirements:
No more guidance

No more appendices

S700 Road pavements - General

S800 Road pavements – Unbound, Cement and other Hydraulically bound Mixtures

S900 Road pavements – Bituminous Bound Materials

S1000 Road Pavements – Concrete Materials

S1100 Kerbs, Footways, Cycleways and Paved Areas

New Pavements document structure

Specification for Highway Works (SHW)

		Part (discipline)								
		G	**L**	**C** (Civil Engineering)					**T** (Technology)	
		General Principles and Scheme Governance	Sustainability and Environment	Road Layout	Pavements	Highway Structures and Bridges	Drainage	Geotechnics	Control and Communications Technology	Road Lighting
Volume (life-cycle stage)		100-199	100-199	100-199	200-299	300-499	500-599	600-699	100-499	500-999
General information	**G**									
Appraisal	**A**									
Design	**D**									
Contract preparation	**P**									
Construction	**C**									
Maintenance and Operation	**M**									
Inspection and Assessment	**S**									
Disposal	**Z**									

CC 201, CC 202, CC 203, CC 204, CC 205, CC 206, CC 207

No more S700, S800, S900, S1000 or S1100

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New Pavements document structure

New construction documents

Maintenance documents

CC 201	CC 202	CC 203	CC 204	CC 205	CC 206	CC 207
Foundation construction	Flexible pavement construction	Rigid pavement construction	Surface treatments	Maintenance of asphalt surfaced pavements	Maintenance of concrete pavement layers	Footways, cycle tracks, kerb units and access steps

Asset lifecycle

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Updated DMRB

- **The Design Manual for Roads and Bridges (DMRB)** contains information about current design standards relating to the design, assessment and operation of motorway and all-purpose trunk roads in the United Kingdom.
  - Pavement related documents updated 2020/2021 with a 5-year cyclic review

CD 224 – Traffic assessment

CD 225 – Design for new pavement foundations

CD 226 – Design for new pavement construction

CD 227 – Design for pavement maintenance

CS 228 – Skidding resistance

CS 229 – Data for pavement assessment

CS 230 – Pavement maintenance assessment procedure

CM 231 – Pavement surface repairs

CD 236 – Surface course materials for construction

CD 239 - Footway and cycle track pavement design and access steps

CD 241 - Design for pavement maintenance of footways and cycle tracks

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New document structure – links to DMRB

New construction documents

Maintenance documents

CC 201	CC 202	CC 203	CC 204	CC 205	CC 206	CC 207
Foundation construction	Flexible pavement construction	Rigid pavement construction	Surface treatments	Maintenance of asphalt surfaced pavements	Maintenance of concrete pavement layers	Footways, cycle tracks, kerb units and access steps

Asset lifecycle

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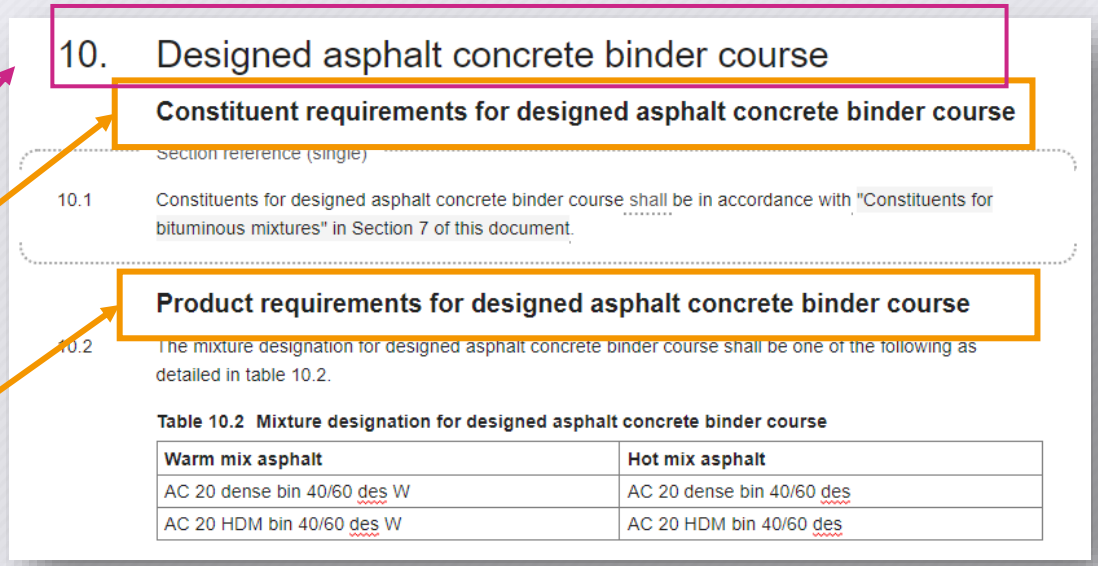
New Clause structure

- ✓Consistency between clauses (no more 942, 929..)
  - ✓Constituents
  - ✓Products
  - ✓Installation

All clauses have:

- only one subject
- a standard format
- consistent wording.



10. Designed asphalt concrete binder course

Constituent requirements for designed asphalt concrete binder course

Section reference (single)

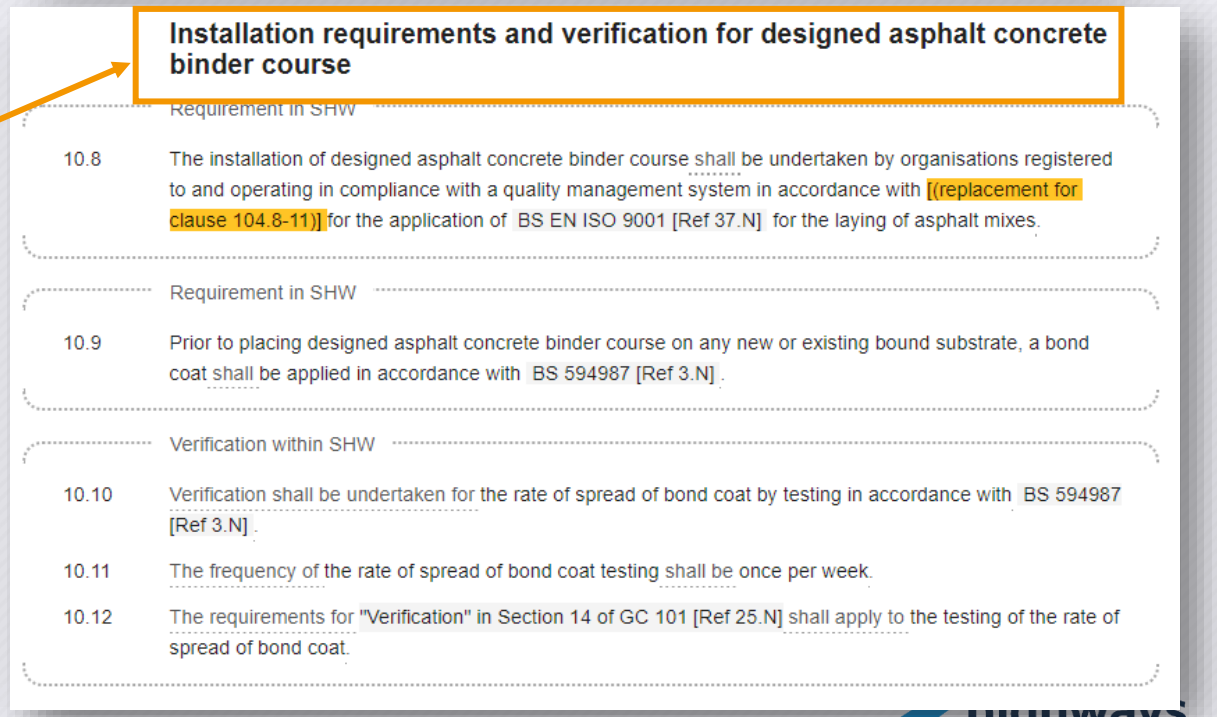
10.1 Constituents for designed asphalt concrete binder course shall be in accordance with "Constituents for bituminous mixtures" in Section 7 of this document.

Product requirements for designed asphalt concrete binder course

10.2 The mixture designation for designed asphalt concrete binder course shall be one of the following as detailed in table 10.2.

Table 10.2 Mixture designation for designed asphalt concrete binder course

Warm mix asphalt	Hot mix asphalt
AC 20 dense bin 40/60 des W	AC 20 dense bin 40/60 des
AC 20 HDM bin 40/60 des W	AC 20 HDM bin 40/60 des



Installation requirements and verification for designed asphalt concrete binder course

Requirement in SHW

10.8 The installation of designed asphalt concrete binder course shall be undertaken by organisations registered to and operating in compliance with a quality management system in accordance with [(replacement for clause 104.8-11)] for the application of BS EN ISO 9001 [Ref 37.N] for the laying of asphalt mixes.

Requirement in SHW

10.9 Prior to placing designed asphalt concrete binder course on any new or existing bound substrate, a bond coat shall be applied in accordance with BS 594987 [Ref 3.N] .

Verification within SHW

10.10 Verification shall be undertaken for the rate of spread of bond coat by testing in accordance with BS 594987 [Ref 3.N] .

10.11 The frequency of the rate of spread of bond coat testing shall be once per week.

10.12 The requirements for "Verification" in Section 14 of GC 101 [Ref 25.N] shall apply to the testing of the rate of spread of bond coat.

Technical changes

Drivers

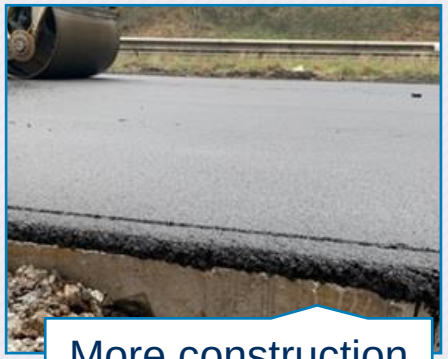
- Safety
- Customer experience
- Decarbonisation
- Technology

Changes

Appropriate verification

Lower carbon binders/technologies

Performance specifications



More construction options

Intended outcomes

- Lower carbon construction
- Reduced construction time
- Reduced departures from standard
- Reduced people on site

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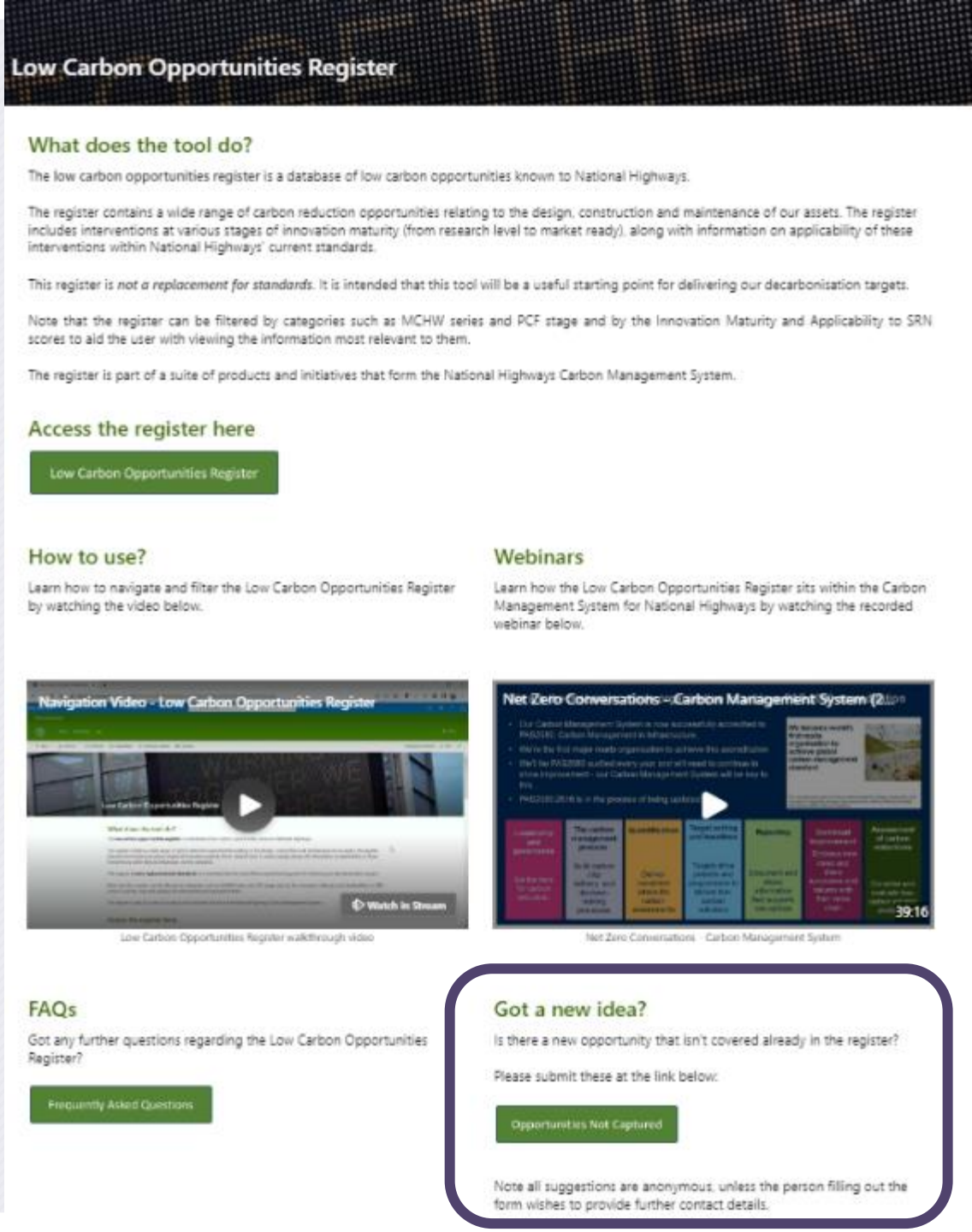
Low carbon opportunities register

Our ambition was: to develop and maintain a comprehensive register of all low carbon opportunities known to National Highways. This is designed to be a single source of reference.

- Hosted on the National Highways Environmental Sustainability SharePoint page
- Available to all national highways staff and the supply chain (request access)
- Contains ~200 carbon reduction opportunities & growing

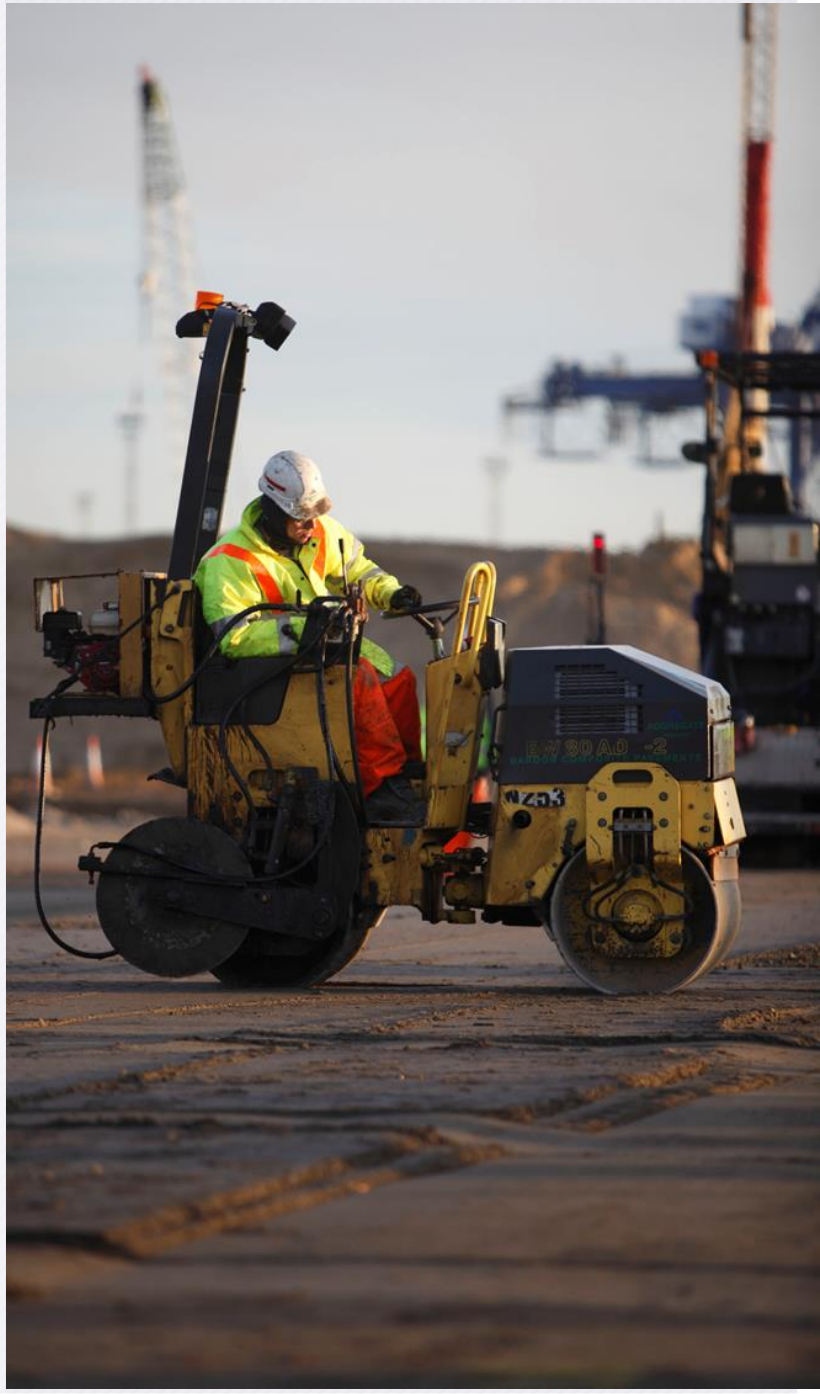
Updates or additions to the register can be logged via a form available on the landing page



Contents

CC 201 – Pavement foundations - Materials

- Inclusion of **capping** within the pavement documents
- Review and update to open opportunity for **lower carbon** cement/binders
- Inclusion of materials for **narrow widening** (also in DMRB)
- Requirement for **pre-cracking CBGM** and cement-based HSS (C8/10 or higher)
- Clarity on subgrade testing



CC 201 – Pavement foundations - Performance

Efficient use of materials

Any combination is permitted

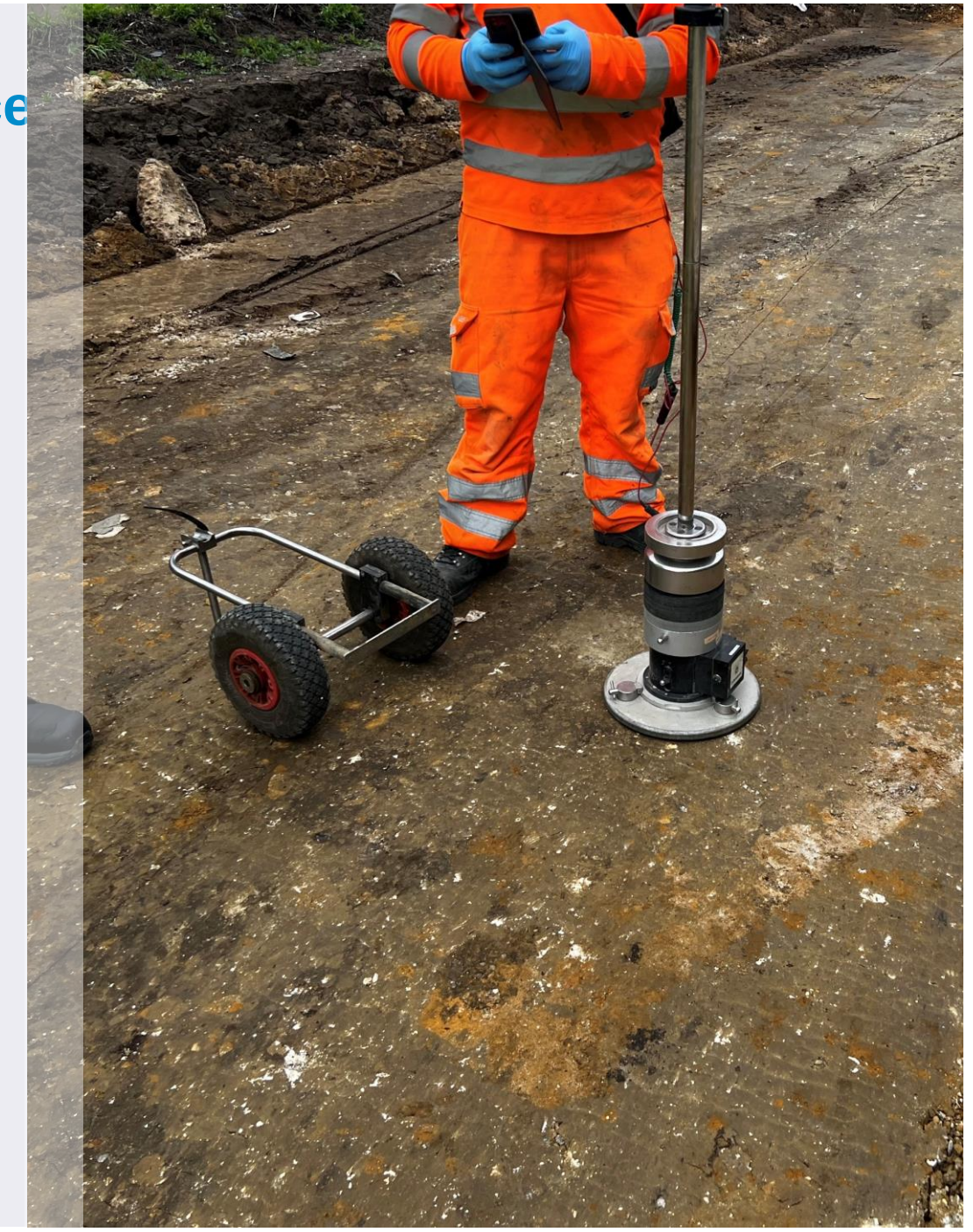
Asphalt can be used in ‘composite foundations’ (multi-layer)

Layer stiffness

Any permitted (but 20% Ec for HBM)

Testing

FWD/LWD correlation – documentation is required



CC 201 – Pavement foundations Future updates

- Moving from method to end-product compaction
- Alternatives to Nuclear Density Meters
- Review Class # for capping

Contents

Why two flexible pavement documents?

New construction

Full possession of area

Lay to meet design levels

‘Standard’ materials and techniques

Opportunity for additional QC testing

Maintenance

Time pressured possessions

Mill to specified depth

Match existing levels

Wide range of treatments and techniques

No time for coring

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Testing requirements – Designed asphalt concrete binder course example

	Refusal air voids	Resistance to permanent deformation	Air voids – indirect density gauge	Air voids – core pairs in wheel tracks	Air voids – core pairs at unsupported edges
Clause 929	? Contract specific	? Contract specific	✓	✓	✓
CC 202.10 (new construction)	No requirement	No requirement	✓	✓	✓
CC 205 (maintenance)	No requirement	No requirement	✓	No requirement	Use density gauge

Type testing in PD 6691 and BS 594987 still applies.

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Incorporation of innovative materials and techniques

In situ recycling – the down-cut process

Orange TSCS

Asphalt SAMI

Infrared thermal repairs

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England Stone Mastic Asphalt (SMA) Surface Course

Permitted for new construction and maintenance.

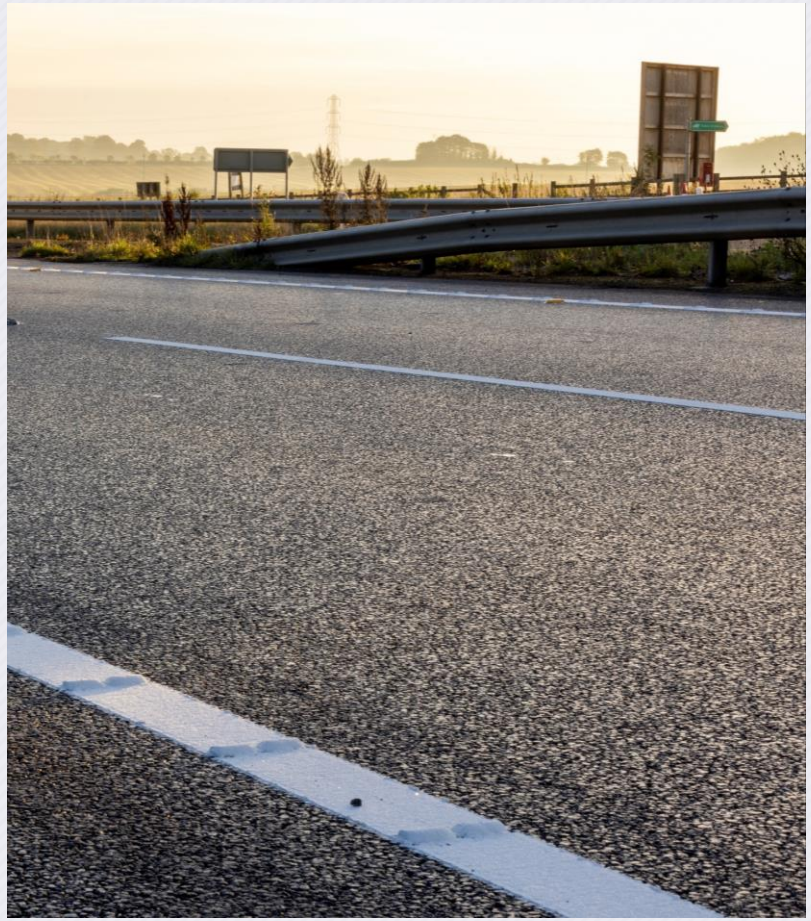
10 mm aggregate size only with specific PMB types:

- 75/130–75
- 40/100–65

PMB requirements for different sites are in CD 236 linked to durability and ensuring whole life value.

Initial texture depth 0.8 – 1.4 mm.

Verification of noise, texture and in situ air voids performance via Type Approval Installation Trial (TAIT).



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Cold Recycled Bound Material (CRBM)

Ex situ CRBM

Permitted up to **80 msa** following in-service performance investigation

In situ CRBM (including down-cut process)

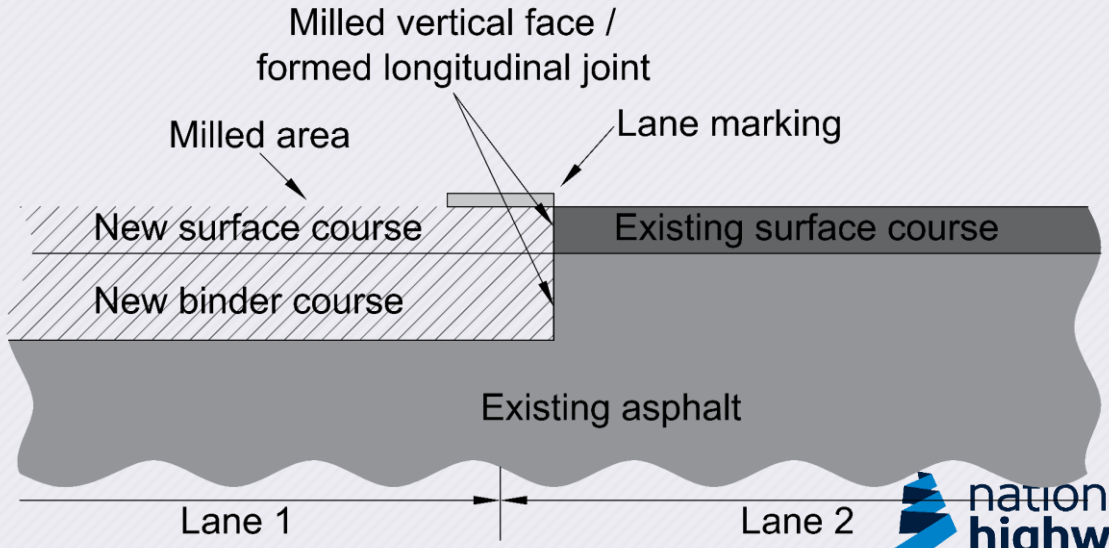
Limited to **30 msa** (pending further data from innovation trials)

Longitudinal joints and milled vertical faces

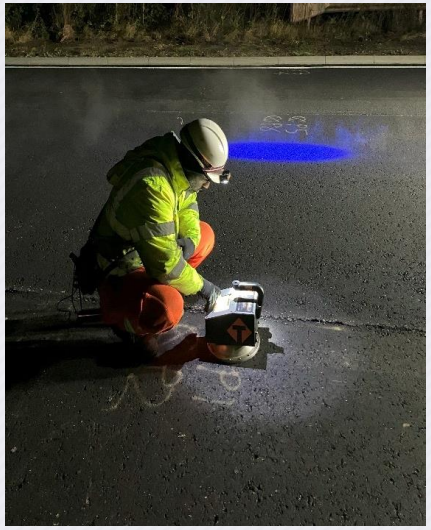
Offsets between successive longitudinal joints / vertical faces is a design decision.

New construction
CD 226 Section 5
Min. 300 mm unless in the specific circumstances listed in CD 226 e.g. widening or TM constraints.

Maintenance
CD 227 Section 6
Design to remove the full lane width of material.
Vertical faces may be coincidental in some scenarios e.g. single lane inlays.



Future standards updates – Use of technology to replace established verification tests



Laying and compaction	Laying records
	Temperatures
	Air voids
Surface characteristics	Surface regularity
	Surface macrotexture

Digital paving records (inc. GPS)
Infrared scanning
Roller-based measurements
Traffic-speed laser-based measurements

Contents

Two rigid pavement documents

CC 203 Rigid pavement construction

New construction:

CRCP & CRCB

RCC

URC and JRC (for widening only)

Constituents
Placement, curing, protection, trafficking
Dowels, tie bars, reinforcement
Joints and sealing

End-product testing as per S700 / S1000

CC 206 Maintenance of concrete pavement layers

Concrete repairs:

Full and partial depth repairs

Under slab grouting

Crack stitching

Crack and Seat

Cross-referencing back to CC 203 where appropriate

End-product testing appropriate for repair type

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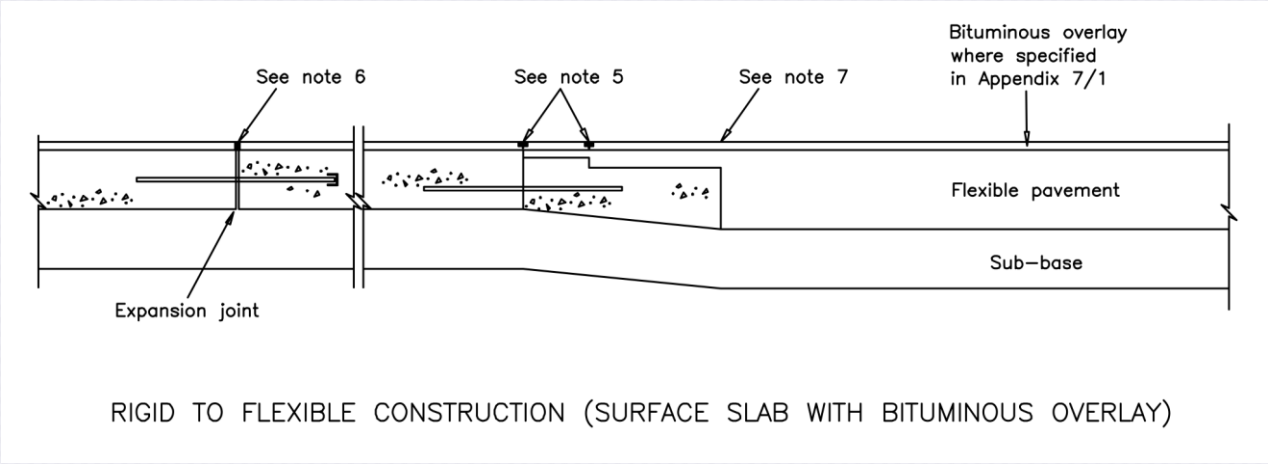
Example of archived content

Construction options

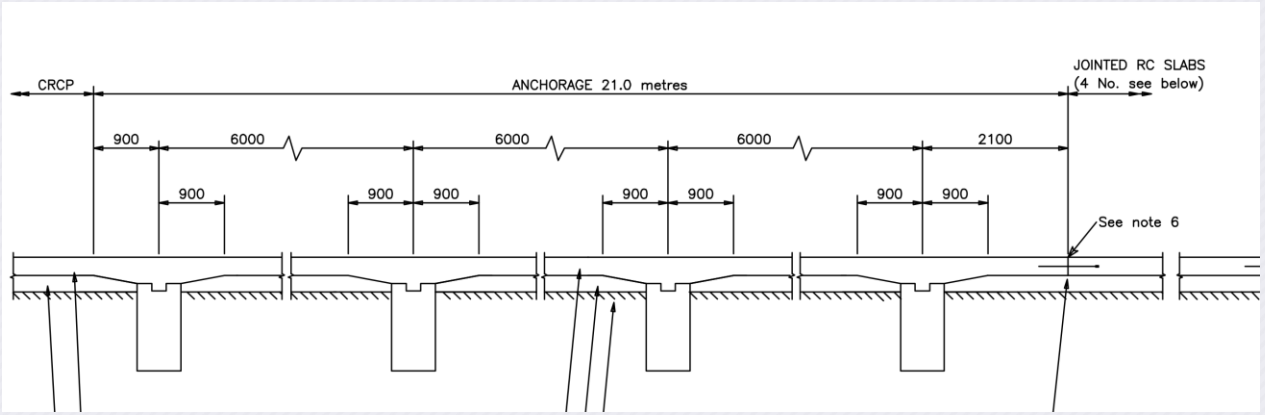
- JRC and CRC for new construction
- Groove formers and crack inducers
- Diagonal tie bar repairs

Method-based construction requirements

- Construction
- Curing, protection and trafficking



RIGID TO FLEXIBLE CONSTRUCTION (SURFACE SLAB WITH BITUMINOUS OVERLAY)



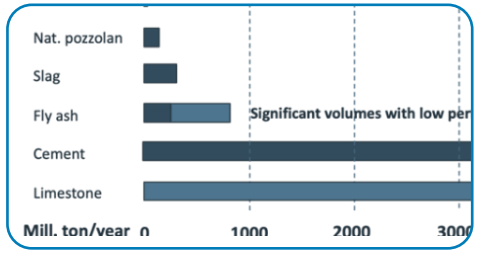
Rigid pavements - Changes to content

Outcome-based requirements

- Removal of pass-fail criteria for trial lengths
- PQC Flexural/compressive strength relationship validation for CRCP
- Maturity-based protection, curing and trafficking

Adoption of BS and EN Standards

- Placement, curing, protection and trafficking to BS EN 13670
- Joint sealing preparation to BS 10498
- Roller compacted concrete to BS 9227



Lower carbon concrete

- Portland-limestone cements permitted in PQC
- Ternary cements permitted
- Removal of ST concrete mixes for lower strength concrete

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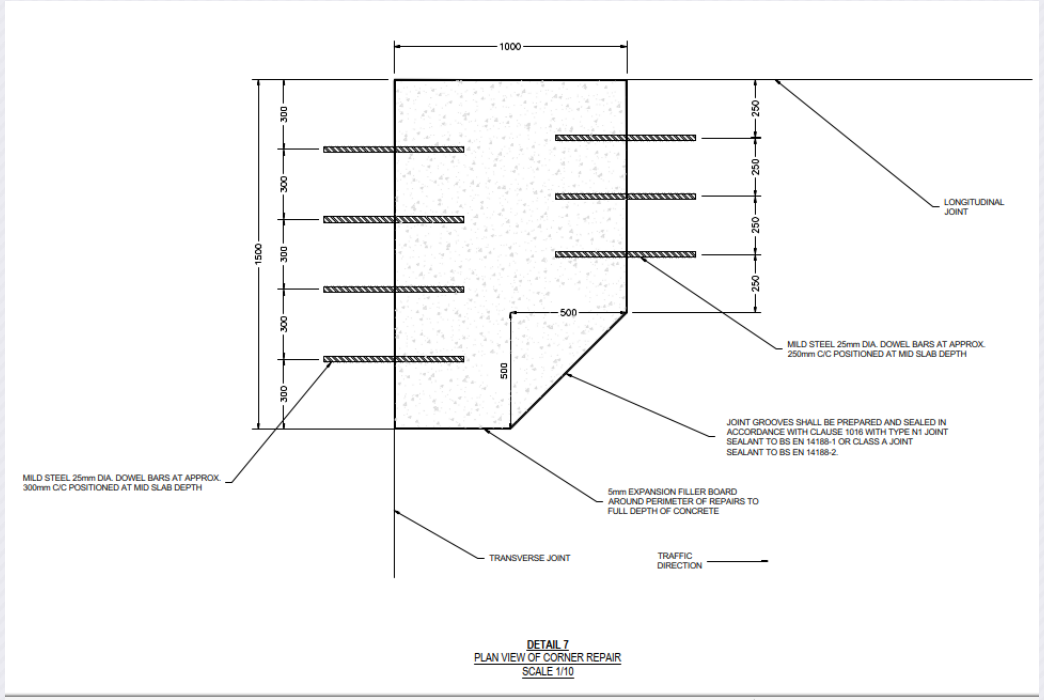
Potential future updates to SHW and DMRB for concrete repairs

Materials

- Ternary cements for PQC
- Basalt reinforcement and dowel bars

Techniques

- Concrete repair products for shallow repairs
- Full depth corner repairs
- Separation membranes (?)
- Retrofitting dowel bars



CC 206 Repairs to concrete pavement layers

Incorporates learnings from legacy concrete programme and good practice from the CPMM

Opportunity for using proprietary materials using third party certification

Two-year guarantee for polymeric materials

Accompanied by associated DMRB content

Contents

CC 204 – Pavement surface treatments

HFS

- Compliance with BS 8870 required
- Specify thermosetting or thermoplastic

CAUTS

Preservatives

- Product acceptance scheme certification
- SIPT needed (PAS)

Emergency area surface treatment

- HFS in accordance with BS 8870

Slurry surfacing

Surface dressing

- Recipe specification
- Performance specification

Longitudinal diamond grinding

Fine milling of concrete surfaces

Contents

CC 207 - Footways, cycle tracks, kerb units and access steps

Modular paving – updated references and clear design outputs

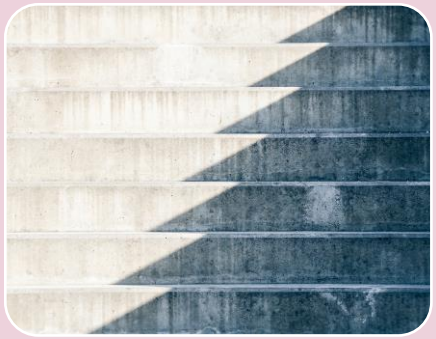
Warm mix asphalt options included to reduce embedded carbon

Lower cement content

- Use of designated concretes for kerb backing and bedding

Removal of high carbon/high maintenance options

- In situ concrete and permeable block paving

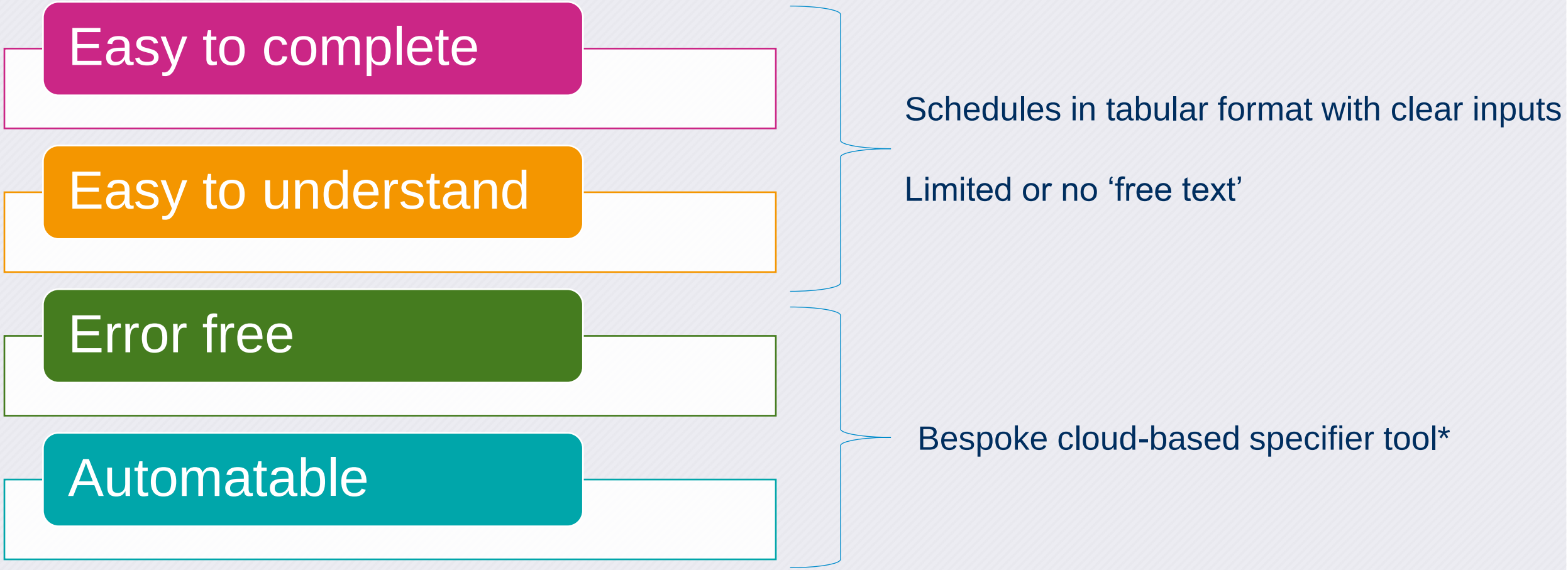


Contractor design lower carbon options

- Cellular paving
- Access steps

Contents

Work specific requirements – stakeholder drivers and approach



*Spreadsheet format available

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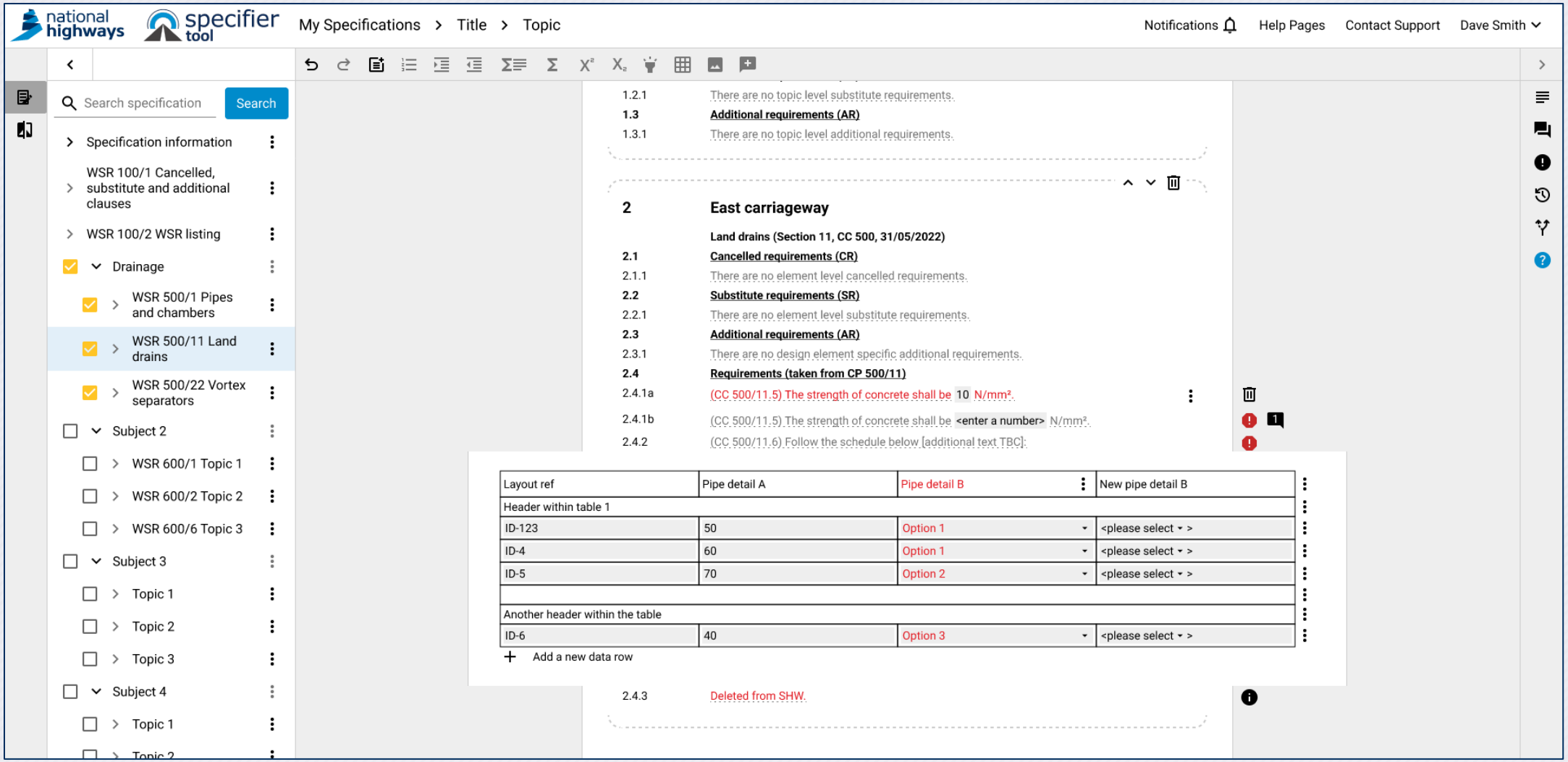
Work specific requirements – Example format



Work specific requirements – flexible pavements (current schedule 1 in appendix 7/1)

CC 202/WSR/001 General requirements for flexible pavement construction

Version LIVE, 2024-10-03

Instruction for completion: remove rows marked with an asterisk before issuing as part of a tender or contract.

1 **[Element 1]**

General requirements for flexible pavement construction

Section 1, CC 202 version LIVE, 2024-10-03

1.1 **Work specific requirements**

1.1.1 (CC 202/1.1) Flexible pavement construction shall be:

Drawing/model number (a)	Design level document number (b)	Location (c)	Chainage from m (d)	Chainage to m (e)	Flexible pavement option (f)	Pavement foundation option (g)	Minimum PSV (h)	Maximum AAV (i)

a) Enter text, to define the drawing or model number which contains the location where the permitted pavement option is to be constructed.
b) Enter text, to define the documentation which contains design level information.
c) Enter text, to define the location of the pavement option [e.g. road name, direction, lane].
d) Enter a number in units of m, to define the start chainage for the pavement option.
e) Enter a number in units of m, to define the end chainage for the pavement option.
f) Enter one or more values, from options as defined in Flexible pavement option of WSR 202/001, to define the corresponding reference for work specific pavement construction requirements.
g) Enter a value, from options as defined in Pavement foundation options of WSR 201/002 or WSR 201/003, to define the pavement foundation option for use with the pavement option.
h) Enter text, to define the minimum Polished Stone Value (PSV) of the coarse aggregate or coated chippings in the surface course.
i) Enter text, to define the maximum Aggregate Abrasion Value (AAV) of the coarse aggregate or coated chippings in the surface course.

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Work specific requirements - Clear links to the DMRB

Asphalt base course and binder course material selection

E/4.1 The following shall be detailed for each asphalt base course and binder course:

1) mixture designation(s); and
2) course nominal thickness.

E/4.1.1 Multiple mixture designations may be selected to permit different mixtures and/or warm mix or hot mix asphalt.

E/4.1.2 The mixture designation(s) and course nominal thicknesses should be selected so that:

1) each layer can be within the nominal layer thickness range in BS 594987 [Ref 1.N] ; and,
2) the allowable surface level construction tolerances does not result in a reduction of the installed layer thickness below the minimum compacted thicknesses in BS 594987 [Ref 1.N] .

Designed asphalt concrete base course

E/4.2 The mixture designation for designed asphalt concrete base course shall be selected from the options in Table E/4.2.

Table E/4.2 Mixture designations for designed asphalt concrete base course

Material type	Mixture designation
Designed asphalt concrete base course	AC 32 dense base 40/60 des W
	AC 32 dense base 40/60 des
	AC 32 HDM base 40/60 des W
	AC 32 HDM base 40/60 des

E/4.2.1 Warm mix asphalt (designation W) should be selected in addition to the hot mix equivalent.

Work specific content

Requirements and advice for design

Contents

Publication and next steps

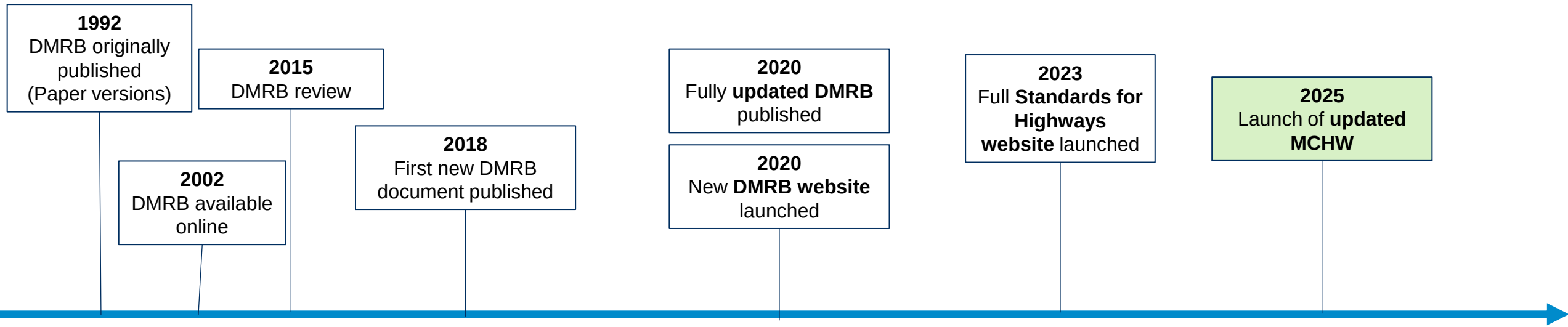
Supporting materials will be provided by National Highways prior to the ‘go live’ date in 2025.

The new SHW will be applicable to all new contracts signed after the ‘go live’ date.

Pre-publication versions are available now via Britpave or Mineral Products Association.

The new digitised SHW enables standards to be updated and published within 11 weeks. After 2025 we will continually look to update our standards to include innovations that support our net zero journey.

Implementation & Industry Support



The updated MCHW will be published on the Standards for Highways website.

The updated MCHW will start to be implemented from 2025.

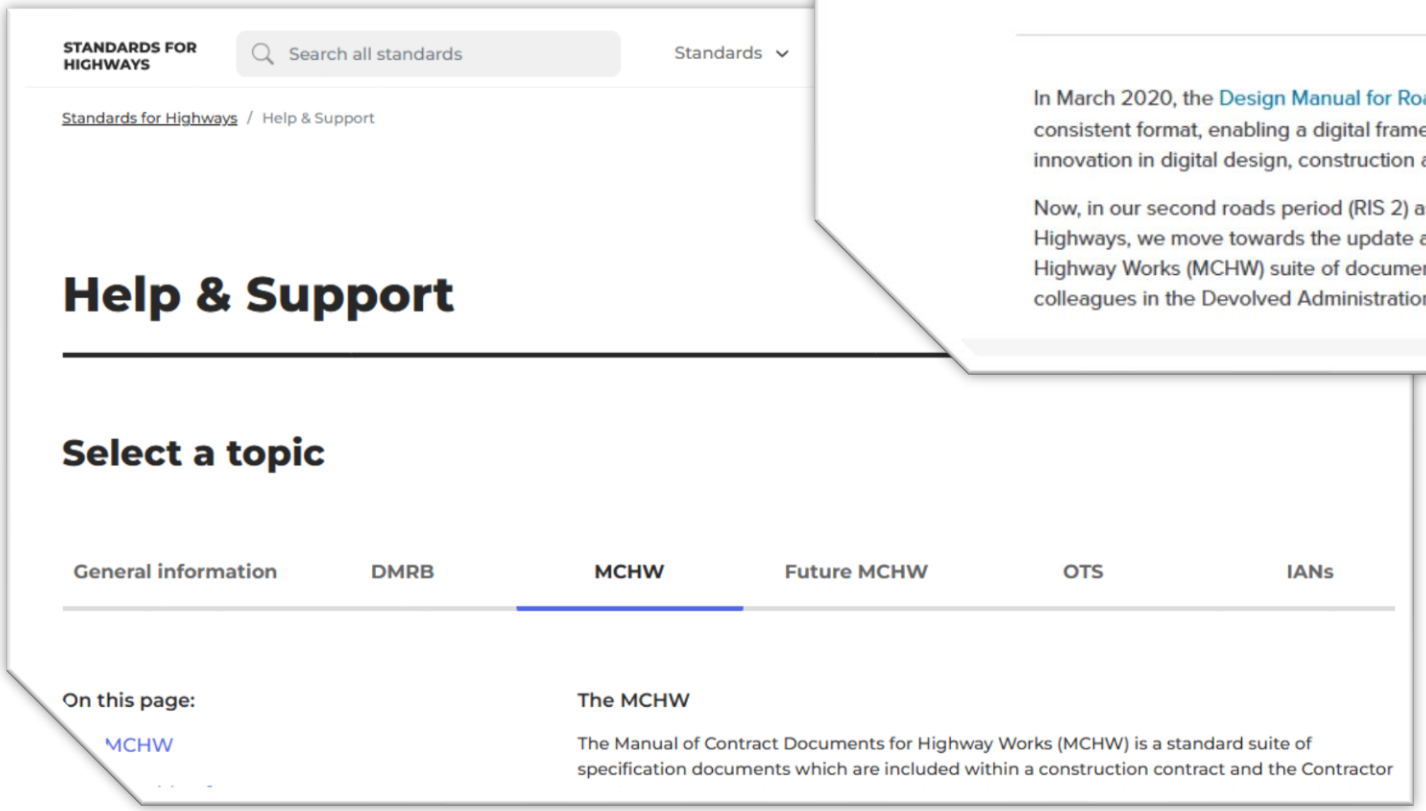
- In-flight projects are likely to continue to use existing standards. Project teams will advise.

Support will be provided; updates will be shared on the Standards for Highways website.

For questions on the communication plan, please contact
Kelson Dos Santos
Kelson.DosSantos@nationalhighways.co.uk

More information

- MCHW hub
- Help&support



Launch and industry awareness sessions to date

Britpave Conference 2024

IAT evening sessions

IAT paper on Yearbook

Certified Pavement Engineers familiarisation event

Other meetings with stakeholders: MPA, CoE

Find out more

carbon@nationalhighways.co.uk

Request access to

https://highways.sharepoint.com/sites/NHEnvSusCarbon/SitePages/Low-Carbon-Opportunities-Register-All-Access.aspx

https://www.standardsforhighways.co.uk/help?tab=mchw

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Thank you for listening
Any questions?