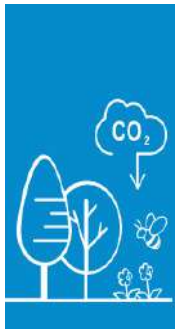
Pavement Category Strategy

Executive Summary - Pavements

Pavements are the Road Surface that vehicles travel on, covering the materials, plant and labour to carry out bituminous and concrete patching, surfacing and Pavement construction operations. This includes works such as milling, paving, iron work adjustment and renewal, sub-base, binder thin course surfacing, tack coat, regulating course, in situ and ex-situ pavement recycling. Please note that the provision of TTM and road markings feature within SDF lots for OD with concrete being delivered via the new concrete roads programme.

Current Status:
Implement and deliver a strategy for Pavement that supports all NH investment programmes, improving safety, productivity, innovation, design, standardisation, carbon reduction/environmental solutions, social value enhancements, efficiencies and cost savings
Through extensive collaboration, engagement, lessons learnt and working groups (with internal/external stakeholders) we have identified business requirements and developed a strategy to support the Operations Directorate (OD) and Major Projects (MP) via different approaches rather than a 'one size fit's all'



Challenges:

- **For OD:** Procure a bespoke NH OD focused framework (aligned with the new SDF model). Develop a lot structure which will increase SME opportunity and expand supplier base. Develop an incentivisation mechanism that allows the opportunity to explore services and products, including increasing the use of warm mix and other environmental options (recycling materials and methods)
- **For Major Projects – CIP, LTC, RIP & SMA:** Move away from a NH framework and allow the main providers (Tier 1's) the ability to enter directly into contract with Pavement suppliers. Increasing Tier 1 flexibility to engage with the supply chain will encourage ECI, influence design/innovation, improve programme planning and add value
- **Carbon Targets:** Risk of not achieving targets unless proactive measures and innovative opportunities are prioritised.
- **Early Engagement:** Early engagement with programme, project management & key stakeholders to endorse and promote alternative pavement solutions.

To fully address the challenges and to align with our imperatives the strategy recommendations are as follows:

- **Drive Innovation** by optimising supply chain experience and expertise to identify alternative pavement options to help facilitate design and efficiency opportunities. ECI and collaboration with SES and other innovation/improvement working groups..
- Delivery through lean practices working in collaboration with the supply chain that will enable us to achieve our outputs and efficiency targets
- **Build Change** through early supplier engagement, extensive collaborative planning and driving improvements working with the Pavement community and wider NH improvement projects. Pavement supply chain to deliver realisation of NH **Net Zero Carbon.**
- **Incentivise supply chain** to drive change and improvements to safety and customer experience/satisfaction. Drive efficiencies through productivity (optimising the working windows), cost savings and reduced time on the SRN.
- **Standardisation** across the business and supply chain through engagement with SES and internal stakeholders . Utilising skill set from Pavement community, Pavement Optimisation Group (POG), innovation reapplied and sector improvement projects.
- **Shape the Market** increasing and challenging the supply chain ,accessing new pavement alternative products and methods. Engagement/embed category management within the supply chain and MP/OD communities to ensure continuous improvement/innovation is applied and improve measures around performance KPIs.

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Pavement

- The Road Surface that vehicles travel on.
- The materials, plant and labour to carry out bituminous and concrete patching, surfacing and Pavement construction operations.
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- Please note that the provision of TTM and road markings feature within SDF lots for OD with concrete being delivered via the new concrete roads programme.

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Key aims of the Strategy

Build Change through early supplier engagement, extensive collaborative planning and driving improvements working with the Pavement community and wider NH improvement projects. Pavement supply chain to deliver realisation of NH **Net Zero Carbon.**

Drive Innovation by optimising supply chain experience and expertise to identify alternative pavement options to help facilitate design and efficiency opportunities. ECI and collaboration with SES and other innovation/improvement working groups.

Incentivise supply chain to drive change and improvements to safety and customer experience/satisfaction. Drive efficiencies through productivity (optimising the working windows), cost savings and reduced time on the SRN.

Standardisation across the business and supply chain through engagement with SES and internal stakeholders . Utilising skill set from Pavement community, Pavement Optimisation Group (POG), innovation reapplied and sector improvement projects.

Shape the Market increasing and challenging the supply chain ,accessing new pavement alternative products and methods. Engagement/embed category management within the supply chain and MP/OD communities to ensure continuous improvement/innovation is applied and improve measures around performance KPIs.

- Our proposal, in collaboration with MP and OD investment programmes is to deliver through several strategic themes, that will enable us to increase safety, productivity, environmental improvements and cost reduction.(across MP and OD).
- Potential savings across all investment programmes, OD efficiency savings target specifically through the pavement framework (SDF aligned model)
- Pavement communities already in place with the opportunity to bring new suppliers to the table. Dovetail with AD & SDF communities once in place.
- Pavement Optimisation group (POG) previously PEG now being reformed and objectives being set.
- Engagement underway in relation to the development of new OD contractual model, working with key C&P and business stakeholders.

Snapshot on our future vision

Short-Medium Term

Collaborative planning

impacts

Shaping the market

- Improved demand and clear vision of business needs that will increase the opportunity for the supply chain to make investments and commitments that will help National Highways deliver new innovative techniques/methods on the SRN.
- Change the way we operate with the supplier market, work in collaboration with investment programmes, tier 1 & tier 2 partners and SMEs, that will optimise ways of working together to improve safety and delivery.
- Early engagement is key and will help the supply chain shape the pavement design and bring those innovations into reality.
- Influence driven through the pavement category turning opportunities into real life efficiencies.

Medium-Long Term

Improve Procurement Approach

impacts

Shaping the future

- Develop the market to deliver NH initiatives for **Net Zero Carbon**, innovation and supply chain resilience.
- Standardisation and alignment across the investment programmes that will provide assurance of demand/spend and help shape the pavement programme and mitigate supplier capability and capacity concerns.
- Ability to shape future NH contracts that enables smooth operation and delivery for NH operational teams aligning with SDF, bringing pavements closer and embedding them within the SDF community.
- Changing our procurement approach for MP that allows alignment of NH investment programmes main header contracts (CIP/RIP/SMA/LTC), opportunity for Tier 1 to work with NH to expand supplier capability in the market place, driving change through earlier engagement that allows innovation and delivers efficiencies.

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This is a high level overview. Key objectives will be delivered working with stakeholders across all solutions working with key focus groups like - Pavement Optimisation Group (POG).

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High-level Plan to deliver Pavement goals

Short-term
(RP2 Year 2)

- Delivery via existing Pavement Framework (Pavement community established)
- Identify and develop new OD contracting model
- Pavement Optimisation Group (POG) to identify opportunity's and action plan
- Support implementation of the SMA Pavement Framework

Greater collaboration between pavement supply chain, tier 1/designers and project teams that will help influence design and improve programme planning ,add value & generate wider opportunities for NH.

Mid-term
(RP2, Years 2-3)

Phase 1:

Identify projects for opportunity to achieve POG targets/deliverables

Implemented and delivery against new OD contractual model (SDF aligned)

Phase 2:

Implementation and delivery of actions from POG linking across OD/MP

Support delivery of SMA community objectives

Standardisation across lean and sector improvement projects. Risk and opportunities identified across all investment programmes that will help shape the market and deliver change and increase innovation.

Long-term
(beyond RP2, Years 4-5+)

- Realisation of efficiency targets delivered via the OD pavement framework
- Implementation and increased use of optimised Pavement Techniques and Materials
- Pavement Supply chain in collaboration with NH realising Net Zero Carbon goals
- Supply chain driving and demonstrating change through early design

Sharing of best practice/initiatives from a mature supply chain. Increased market capability/wider skills set by RP3. Increased productivity and reduction of time on the SRN.
Performance measured highlighting and rewarding high performance.

Rollout of short to medium term solutions

PSA-01 Delivery via existing Pavement Framework

- Supply chain in place and embedded into CWF/ RDP and pavement communities.
- Work allocation mechanism active enabling early engagement (ECI) for both AD and RDP.

- **Other benefits:** Direct access to experienced suppliers allowing early opportunity for innovation.

PSA-04: Support SMA Pavement Framework

- SMA pavement framework awarded with Pavement supply chain embedded into alliance.
- NH category Lead/managers embedded into the alliance community.

- **Other benefits: D**irectly working under the alliance partners.
- Basis to grow market capacity, increasing SME capability through mature supply chain experience.

PSA-05: Align Strategies for MP Investment Programmes

- Move away from NH framework for MP- unlocking value opportunity via tier 1 contracting**.**
- Support MP programmes (CIP/LTC/RIP/SMP), driving early collaboration between supply chain and designers, to shape and optimise programme and alternative pavement opportunities.

- **Other benefits:** Alignment with NH main header contracts.
- Drive improvements and innovation, linking in with SSCG (DIP) and NH sector improvement projects.

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Rollout of medium to long term solutions

PSA-06 Pavement Optimisation Group (POG) (Delivery through Lean practices)	• Internal stakeholders and supply chain working collaboratively as part of Pavement Optimisation Group (POG)- previously PEG. By delivery through lean practices will enable us to achieve our outputs and efficiency targets. • Trial, implement and share initiatives generating measurable efficiencies.	• **Other benefits:** Increase productivity. • Identifying solutions delivering through lean practices. • Drive innovations that will help deliver to NH efficiency targets .
PSA-08 Innovative Materials and Techniques (Including decarbonisation)	• Work with SES, project teams and the supplier community to identify alternative pavement solutions. • Engage and deliver via innovation reapplied. • Identify direct sourcing opportunities for more efficient solutions (recycling products/techniques).	**Other benefits:** Alignment of NH and suppliers' objectives, drive improvements and innovation (e.g. reduce carbon footprint) • Utilisation of warm mix generating greater efficiencies.
PSA- 10 Pavement Framework (Replacement) Delivery for OD/SDF alignment	• Working with key C&P stakeholders to develop a new pavement contracting model. • Develop performance and incentive metrics aligning with SDF objectives. • Outputs on innovation and efficiency delivered in collaboration with POG.	• **Other benefits:** Alignment with SDF • Sharing of safety initiatives, improving quality and experience for the customer.

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Carbon Strategy

Key drivers of carbon emissions in category	Corporate emission	Maintenance & construction emission	Road user emission	Estimated Carbon emissions per year associated with key driver [tons of CO2]
• Introduce new environmental techniques and materials on road construction and maintenance • Design optimisation		x		Discuss with SES to identify

Identified measures to address key drivers in category	Expected impact / CO2 reductions [tons of CO2]	Timescale	What is needed to implement measure (investment/support, etc)?
Default the use of WARM Mix Asphalt (WMA)	Reduces CO2 emissions associated with asphalt production by 10%	To be applied on all base and binder by 2024	Standards to be applied to move away from departure process. Standards approved and implemented July 2021. This will mean targets will be met. (make default in upcoming PDF tender)
Increase recycled content in Surface Course from 10% Recycled Asphalt Planing (RAP) to 20%	2% reduction (by re use of bitumen & high PSV aggregate)	Ability to apply to Surface Course with standard by 2023	Working alongside SES to review existing specifications and to amend standard to allow for up to 20% recycled content- clause 942 in draft expected to be published Mid 2022. (incorporate requirement for RAP into PDF scope)
Increase application of Ex Situ Cold recycled base material (CRBM) Foam-mix	Reduces CO2 by approx. 50% (application by 35% Foam-mix plus 10% WMA process.)	See Increase of usage and apply where viable by 2025	ECI, trails on a scheme by scheme basis working with SES and project teams.
Increase application of In-Situ Recycling	Awaiting data with SES	TBC- future need	Learn from trials, design guidance required- continue to engage with SES and project

Carbon Reduction – Pavement

Global climate change, energy conservation and reduction of carbon emissions have become critical issues in the highway construction industry. National Highways is committed to reducing our carbon footprint through supplier initiatives, introducing new environmental techniques and materials on road construction and maintenance. These will offer enhanced efficiencies, demonstrating lower-carbon results to meet the net zero UK carbon emissions agenda by 2050.

Warm Mix Asphalt (WMAs)

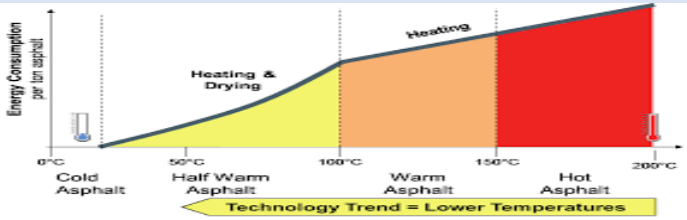
Significant lost opportunity of not switching to WMA.

- Target: 80% of scheme pavement asphalt base & binder material to be supplied as warm mix by 2024

WMAs can offer a range of benefits when compared to conventional hot mix. During production, less energy can be imparted on the mixture, resulting in environmental benefits including:

Reduced carbon footprint. Safer working environment for contractors during installation, lower temperatures can reduce the exposure of construction operatives to fumes.

- WMAs allow longer working windows and/or earlier opening to traffic with reduced risk of early life surface deformation (wheel path rutting) - particularly relevant for thick pavement inlays that need to be placed and opened to traffic in short timescales.
- Up to **40°c lower** compared to traditional Hot Mix Asphalt (HMA). Low temperature asphalt = **10%** reduction in carbon and if at 100°c **= 25%** reduction (half-warm – needs further development of foaming technologies).



Case Studies

Oxidation of hydrocarbon in asphalt binder leads to the production of carbon dioxide (CO_2) during the production of hot mix asphalt. Temperature is a significant factor on emissions.

Incorporating additives in asphalt mixtures is an effective way of lowering the CO_2 emission impact, directly and by the use of less energy for heating. This predicts that up to **30%** reduction in plant energy consumption is possible.

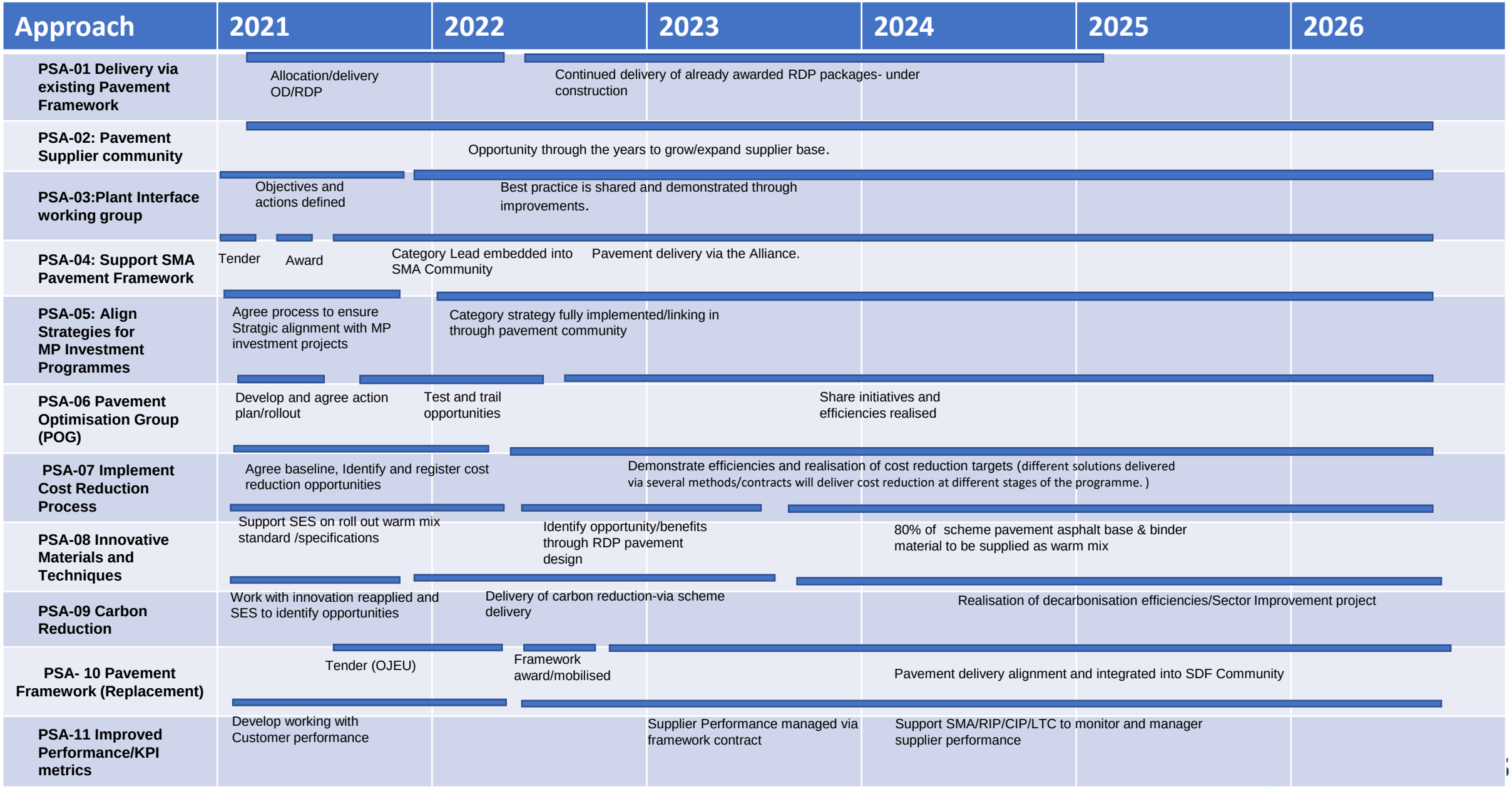
WMA can reduce CO_2 emissions associated with asphalt production on road maintenance projects by approx. **10%**.

Technology Readiness Level: 8 (NH dedicated Clause 908 for WMAs, Published July 2021).

Environmental Levers

- Increase capacity on the network through digital solutions and autonomous vehicles.
- Reduction in site time, optimising programme, through demand and construction management.
- Reducing truck loads (travel time/distance), limiting the capacity required on the network.
- Choice of material design, longer lifespan which will reduce maintenance renewals.
- Collaboration with the supply chain, using a supply chain carbon management process, generating possible carbon savings.
- Collaboration and delivery via Industry Strategies (PID 59): Sustainable Sourcing - Zero Carbon & Waste (Use of recycling materials.)
- Fleet Management of Technologies - Challenge supply chain to operate full electric fleet within 10 years – resulting in a large Carbon reduction.

Implementation Plan Timeline



Lessons Learnt/Engagement Feedback

Framework Challenges

- Suppliers/lots operating under different contracting modules

Demand/Forecast spend not transpired

- £1m threshold - affected behaviours of supply chain
- Allocation percentage splits not aligned with MP/OD programming - affecting collaboration
- Resistance from Tier 1 (contract alignment)

Commercial Challenges

- Schedule of rates not aligned to Highways Method of Measurement
- Ambiguity over application of operational areas/bandings
- Application of adjustments - not applied consistently across regions
- Limited detail/coverage within prelims resulting in additional costs incurred
- Volume of material type items priced

Improvement in Performance

- Consistency of contract and quality management
- Improvements to KPI measures, to capture true operational performance
- Tracking/capturing opportunities and realised benefits
- Identifiable Pavement efficiencies at scheme level
- Monitoring of Supplier AFR

Considerations

- Added resilience within the market identifying right supply chain to deliver works
- Allocation enables direct access to supply chain
- Identify true SMEs - build capability
- Direct sourcing to recycling products/supplier market
- Security of supply/investment in quarries/plants

Environmental Improvements

- Supply chain to deliver environmental initiatives which will reduce carbon footprint – e.g. opportunity to standardise use of warm mix asphalt across the SRN
- Introduce robust Carbon KPI targets/measures
- ECI at initial design phase to shape/ utilise innovative environmental techniques/materials

What we need to do differently

- Incentivisation
- Reduction in cost of construction/whole life, improved asset lifespan
- Expand supplier base, wider market opportunities
- Improved Demand Forecasting
- Clear/aligned objectives
- Reduce site time to improve customer satisfaction

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Statement of Need

A Safer Network

Safety by use of durable and innovative solutions via new products, Innovative automated opportunities to minimise operator injury.

Improving Customer Satisfaction

Customer outcomes by improving standards and durability of road surface, reduce impact to the SRN by better planning/programming, aligning TTM.

Delivering the RIS

Delivering RP2 & 3 via improved delivery methods and products to allow longer life expectancy. Identify environmental & efficiency benefits increasing productivity.

The Requirements

- Further develop and expand the existing supplier markets and assets to mature delivery
- Embed centralised Strategic Procurement Strategy.
- Requirement to align with OD SDF contract
- Allow for innovative suppliers and assets to enter the market to reshape delivery and grow the supply chain.
- Develop & implement a new Pavement strategy that underpins National Highways three imperatives.

The Objectives

- Drive commitment from the supply chain to deliver to Net Zero Carbon agenda (Key measurables)
- Improve Social and environmental behaviours (Recycling and carbon net zero agenda).
- Develop and deliver efficiency measures and targets.
- Develop efficient commercial models and contracts to manage resource demands.
- Standardisation & collaboration across the wider business.
- Improve performance and innovate the supply chain.

The Challenges

- Establish practices/route to market with MP, where direct subcontracting between Tier 1 and Tier 2 (pavements)
- Early engagement, bringing supply chain expertise in earlier to optimise the programme.
- Assurance and accuracy of Pavement forecasting/demand.
- Current Framework expires May 2022, need to ensure security of supply is achieved to enable Safety, delivery and customer service.

The Outcomes

- Access to reliable engaged supply chain/market.
- Evidence, demonstrating delivery and successes from within the supply chain, supporting the Net zero Carbon agenda.
- Improved asset performance (measurable).
- Reduction in road worker safety exposure – right time right place asset interventions.
- Planned roadworks only – customer satisfaction.
- Programme alignment (increased productivity and outputs).
- Capture true efficiencies/savings demonstrating the value and objective of the strategic procurement approach.

Category Profile

Vision:

To create a strategy that provides a sector leading service for delivery areas and programmes. Improving safety, the customer experience, as well as enabling efficiencies and encouraging innovation. Utilising technology to improve products/processes and reduce carbon emissions and environmental impacts.

Goals:

- Improve safety via innovative solutions, new products and technical services.
- Better customer outcomes by influencing and improving standards.
- Enhance delivery methods and longer lasting/alternative products for surfacing.
- Improved environmental ways of working.
- Improved quality for the workforce.

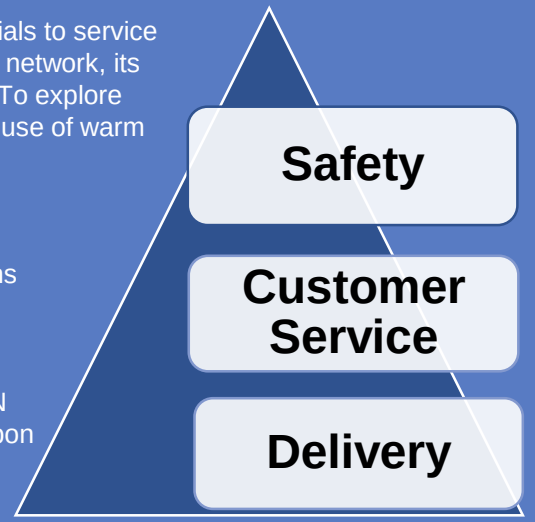
Scope:

To ensure delivery and supply of bitumen materials to service and maintain National Highways Strategic Road network, its Trunk Roads, Motorways and other road types. To explore services and products including increasing the use of warm mix and other environmental options.

Opportunities:

- Support SES on innovation, sustainable solutions and new products to aid the development of enhanced standards which will improve safety, identify environmental benefits and produce a longer life expectancy of the surface on the SRN
- Drive commitment from suppliers to reduce carbon emissions in line with the Net Zero agenda.

Business Need



Pavement Category Strategy

Executive Summary

Landscape:

Pavement in terms of industry context relates to the construction and maintenance of highways and roads (rather than pedestrian walkways) within National Highways Strategic Road Network. Works relating to Pavement include:

- Supply of Materials, Plant and Labour to carry out bituminous and concrete patching
- Surfacing and pavement construction operations
- Planing (milling), Paving
- Ironwork and associated ancillary work
- Adjustment and Renewal
- In-situ and Ex-situ recycling
- Footway surfacing and Asphalt kerbing

Market Analysis

According to National Highways Sector Schemes (NHSS) there are currently 121 NHSS 16 (Laying of Asphalt Mixes) accredited suppliers, operating within the UK. National Highways currently have 11 suppliers listed on the current pavement contract , which are active within the pavement sector, and have historical relationships (as at Tier 1 or lower) with a further 21 suppliers.

Strategic Approach

Objectives	Year 1	Year 2-3	Year 4+
Supplier Engagement	Strengthen/build on Community Forums	Embed Community approach throughout the business (align/keep linked in SMA/MP/OD)	Full collaboration/ECI/ working together
Commercial & Procurement Strategy	Continued supply chain management	Delivery of efficiency targets/value for money	Identify/Realisation of actual vs forecast efficiency targets
Environmental Impact	Identify environmental benefits/solutions within the pavement sector	Increase use of warm mix and trial recycling opportunities	Demonstrate/ evidence of successful impacts to reduce Carbon

Business Requirements and Objectives

Requirement	Low Importance	1	2	3	4	5	High Importance
Assurance of supply	Disruption to supply has a minor impact on operations and / or brand perception					x	Security of supply is critical, disruption will affect safety and damage reputation
Quality	Quality issues have minimal impact on operations and/or				x		Quality performance has a major impact on our operations and/or brand
Regulatory, Ethical, Environmental	Compliance to ethical, environmental or regulations have a minimal impact on our operations or our brand				x		Compliance to regulatory, ethical and environmental issues has high impact on our operations and/or our brand
Service	Flexibility in delivery dates and service levels can be accommodated with minimal impact.					x	Late deliveries / poor service has a major impact on operations / brand
Cost	Cost competitiveness is not a major requirements.			x			Cost competitiveness is highly important for the business as is the ability to understand costs drivers of product / service
Innovation	R&D capability or investments in innovation has minimal impact on operations and/ or brands.			x			Excellent R&D / product engineers and investments to innovate are critical to our operations and/or brand

Conclusion: National Highways is responsible for maintaining, enhancing and operating England's SRN. The SRN is an essential part of the national infrastructure and pavements is the most valuable asset owned by Government. Category management/strategic procurement approach will enable and support the investments into the development of new materials and new technologies that will support how pavements are built and maintained. The engagement and collaboration which category management brings will also help maintained, improve performance in safety and explore environmental opportunity benefits, capture efficiencies' and savings across the category.

HE Directorate	Specific Objectives
SMP	• Standardisation and right first time approach. • Supply chain to commit and help identify carbon opportunities and deliver these working together within the alliance • Improve productivity/reduction of closures. • Earlier and more integrated engagement/collaboration with the supply chain
CIP/LTC	• Supply chain to commit and help identify and deliver carbon opportunities. • Improve productivity through early engagement/help shape pavement design.
RIP	• Establish market capacity and capability to meet NH's RP2 and RP3 pavement requirements. • Deliver sustainable, efficient solutions, • Understand innovation opportunities and identify net zero carbon opportunities • Translate innovation and market opportunity into design standards • Reduce site time to improve customer satisfaction by 50% • Incentivisation of the supply chain collaboration and commitment to deliver.
Operations	• Standardisation and right first time approach • Commitment from supply chain to deliver solutions and net zero Carbon agenda. • Identify Sustainable innovations in products and process. • Realize design capability within the surfacing supply chain • Consistency / compatibility with SDF • Improve asset management and improvement in programming

Product Description – Techniques

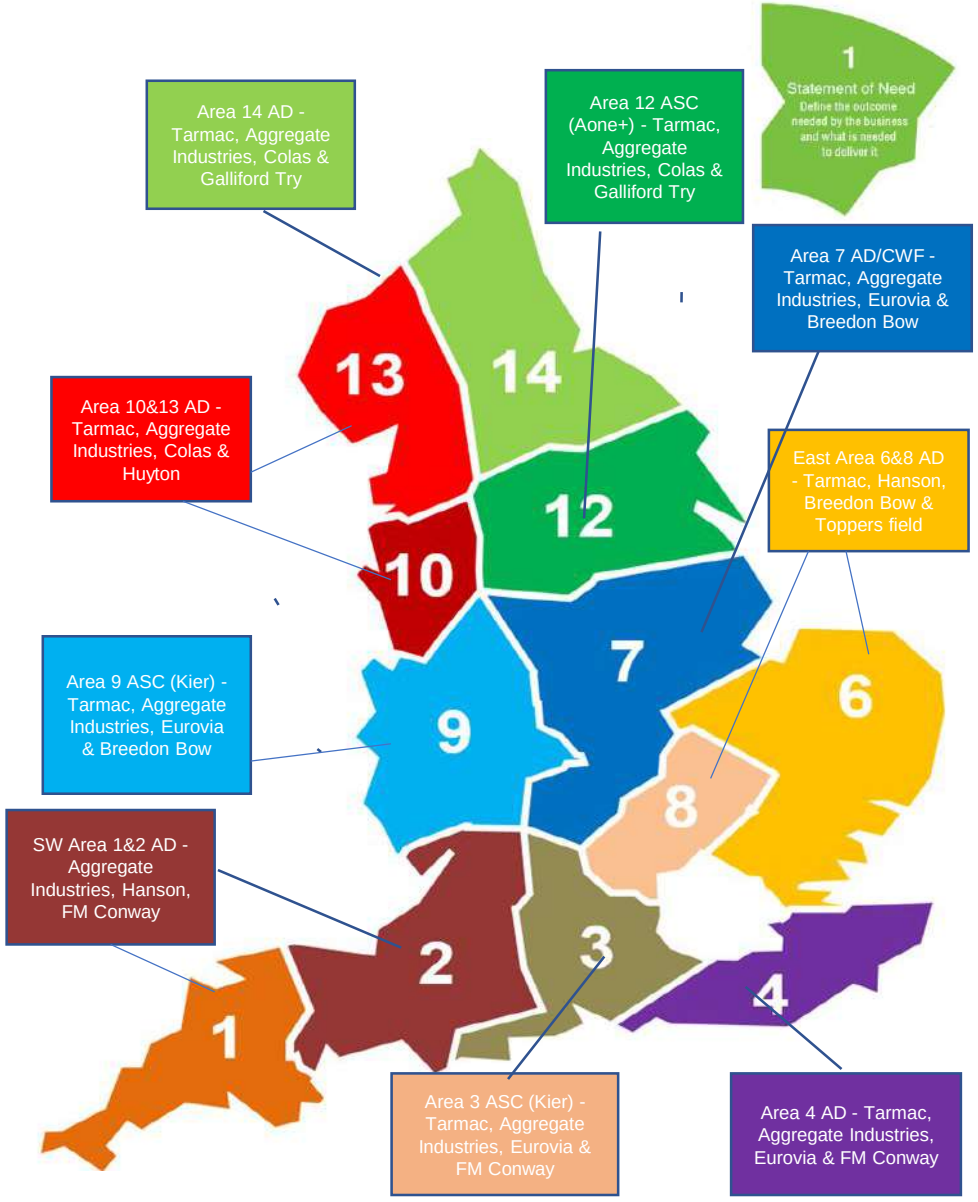
Name	Description
Warm Mix Asphalts	 WMAs can offer a range of benefits when compared to the use of conventional hot mix asphalts. During production, less energy can be imparted on the mixture, resulting in environmental benefits including a reduced carbon footprint. During installation, the lower temperatures used can reduce the exposure of construction operatives to fumes. WMAs also allow longer working windows and/or earlier opening to traffic with reduced risk of early life surface deformation (wheel path rutting), which is particularly relevant for thick pavement inlays that need to be placed and opened to traffic in short timescales. Technology Readiness Level: 8 (a dedicated Clause 908 for WMA published July 2021)
Surface Course Asphalt Innovations	   Incorporation of reclaimed asphalt planings (RAP) into surface course is already permitted up to 10% and should be utilised. Specifications for higher recycled contents in surface course are currently being considered and, as such, departures for higher recycled contents where quality control and early-life performance can be monitored are openly considered. Ground, recycled tyre rubber has also been incorporated into asphalt in network trials. The benefits of using ground tyre rubber are that mixtures will have enhanced flexibility and prove low grade properties that are normally associated with expensive polymer modified binders. 'Longer-life' bituminous binders that slow down the effects of aging caused by oxidation and UV weathering, to enhance the durability of surface courses. Whilst still being trialled, these binders are anticipated to increase service life of surface courses by a few years. Fewer maintenance interventions will reduce network disruption for our road users and the exposure of maintenance operatives to live traffic. Improved whole life costs and sustainability benefits through less consumption of premium natural resources should also be realised. Technology Readiness Level: 7-8 / 9 for up to 10% RAP
Roller Compacted Concrete	 Roller compacted concrete (RCC) road base is a tightly controlled paver laid material, normally batch mixed on site. This high performing material enables the road pavement to be constructed thinner than some other base material alternatives, with a conventional asphalt binder and surface course still required. RCC is particularly suited to larger, new build designs and can save in the order of £1M per carriageway km for pavement construction costs compared with other standard permitted design options. Technology Readiness Level: 9 (DMRB standard CD 226 and Series 1000 of the MCHW facilitate RCC to be used directly).

Product Description – Materials

Name	Description
Recycling to Binder Course and Base Asphalt	 Several methods are already available in the MCHW 900 Series that permit high proportions of RAP to be incorporated into structural asphalt layers. This practice may yield some cost and carbon savings whilst preserving natural resources. Many conventional hot mix asphalt plants are capable of incorporating 30% recycled content with a few additional testing requirements, as specified in Clause 902. Cold recycling techniques are permitted through the use of Clause 947 (in situ) and Clause 948 (ex situ). Cold pave is primarily aimed at lower trafficked roads (≤ 30 msa) and can be used to deal with legacy tar-bound material without the need for disposal in a landfill. Cold recycling utilises very high proportions of recycled asphalt material and therefore greatly reduces haulage to and from site. Both the avoided haulage and low energy inputs result in significant carbon savings when compared to conventional hot mix. Recently a further 'down cut' in situ technique has been used on the network, allowing consistent material to be cold recycled and laid in a single pass. Departures are openly considered to use this new technique. The cost of a cold pave recycling renewal is estimated as similar to the cost of a do minimum (safety) scheme on the same area of pavement. Technological Readiness Level: 7 (down cut) / 9 for other techniques. Both are dependent on design traffic.
Reflective Cracking Mitigation Interlayers	 Geosynthetics, steel meshes and stress absorbing membrane interlayers (SAMIs) can reduce the effects of reflective cracking: a common defect in asphalt layers that overlay hydraulically bound materials including concrete. If correctly specified and installed, these technologies can reduce the frequency of future maintenance interventions. Additional structural performance should not be taken from their use. Technology Readiness Level: 9 (geosynthetics and steel meshes can be specified via Clause 936)
Automated QA Methods	 The use of automated pavement testing is used to assess installed pavement properties, thereby mitigating the risk to operatives who would otherwise be engaged in physical testing on site. Vehicle mounted lasers, radar and other wave detection tools have been developed and are being calibrated against their conventional alternatives to verify texture depth and surface regularity, often at traffic speed. Technological Readiness Level: 7

Current Sourcing & Contract Options

Delivery Model	Procurement Method	Advantages	Disadvantages
Pavement Category management Framework 2018-2022	NEC 3 – Allocation Model – See next slide for percent split	Default Works allocation – no need for secondary competition 4 suppliers per region – 2 major 2 minor	Lot value threshold Commercial model challenges Spend throughput Contract model (long/short form)
Operations-AD (CWF) /ASC	Pavement Category management Framework 2018-2022	Allocation removed the need for secondary competition, better planning and greater collaboration and opportunity for early contractor involvement.	Pavement ECC contract not directly aligned to CWF Term Service contract, effecting commercial assessment dates. Commercial costs of ASC managing fee on top of Tier 2 prices.
Major Projects - RIP	Pavement Category management Framework 2018-2022	Allocation removed the need for secondary competition, better planning and greater collaboration and opportunity for early contractor involvement.	Contract alignment NEC3 against NEC4. Tier 1 contractors need to change contract clauses. Annual allocation not aligned to MP/RDP package process.
Major Projects - SMP	Direct contract with Principle Contractor per project	SMP free to contract on project basis to address their needs. No direct contractual liability on NH. SMA ability to procure supply chain to enter into alliance.	Lack of visibility of efficiencies cost savings. Opportunity lost to innovated and utilise pavement supply chain. Uncertainty of SMP alliance operating model and management of innovation and performance benefits.
Complex Infrastructure Projects	Direct contract with Principle Contractor per project	CIP free to contract on project basis to address their needs. No direct contractual liability on NH. PC could leverage existing relationships to help identify innovation early on.	Dependent on principle contractor, to source and manage . Risks of low cost bias, in supplier selection. Not bringing that supply chain in at the 1st stages of design.



Conclusion: See Lessons learnt workshop and engagement session documentation from working groups for OD/MP and supplier 121 sessions.

Though SMP had the opportunity to direct source, there was the ability to utilise the pavement contract. SMP allocated a number of schemes using the framework allocation process which provided direct access to the major lot suppliers and enabled ability to engage early on to help drive efficiencies through early engagement.

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Current Category Management Pavement Framework Suppliers - Major and Minor Lots by Region

Category Management Pavement Framework 2018-2022						
Major Lots						
Lot 1 (North East)	**Lot 2 (East)**	**Lot 3 (South East)**	**Lot 4 (South West)**	**Lot 5 (Midlands)**	**Lot 6 (North West)**	**Percentage Split**
Tarmac Trading Limited	Tarmac Trading Limited	Tarmac Trading Limited	Aggregate Industries	Tarmac Trading Limited	Tarmac Trading Limited	60%
Aggregate Industries	Hanson Contracting	Aggregate Industries	Hanson Contracting	Aggregate Industries	Aggregate Industries	40%
Minor Lots						
Lot 7 (North East)	**Lot 8 (East)**	**Lot 9 (South East)**	**Lot 10 (South West)**	**Lot 11 (Midlands)**	**Lot 12 (North West)**	**Percentage Split**
Colas Limited	Breedon Bow Highways	Eurovia Infrastructure Ltd	FM Conway Ltd	Eurovia Infrastructure Ltd	Colas Limited	60%
Galliford Try Infrastructure Limited	Toppesfield Ltd	FM Conway Ltd	Cemex Construction Services	Breedon Bow Highways	Huyton Asphalt Ltd	40%

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Value Chain Analysis

Value Chain	Value Factors	Current Situation/Continual improvement	Step Change
Procurement ↓ Design ↓ Development ↓ Delivery ↓ Operations ↓ Maintenance ↓ Demobilisation	• Efficiency - savings from bulk procurement. • Efficiency - Value engineered, standardised design, used as default, optimise pavement solutions. • Quality- Growing capability, high quality service right first time approach and defect free. • Safety - reduced time on site & lower accident frequency rates. • Efficiency - reduced time through efficient methods (optimising working windows). • Efficiency - improved interfaces with other parties. • Customer satisfaction - familiar and consistent appearance. • Network condition – Enhance the quality of our roads to meet customer demands. • Environment – Capability to move away from traditional methods.	• Current framework with a one size fits all mechanism (MP/OD) • Designers sticking to standard design, not open to change need to push alternative working methods. • Build on existing good relationships with the • pavements supplier community • Increase knowledge of the market, utilising new pavement methods/products. • Improve performance and stimulate innovation though collaboration between standards owners, designers and suppliers • No formal process on monitoring/capturing efficiencies between programme delivery/OD to CM. • Regional focus on forward programmes, clear forecast in demand and commitments to build supplier confidence to invest	• Develop strategy to deliver for both OD and MP which moves away from one size fits all approach • Build capability to enable decision making which delivers better whole life value and performance • Improve the return on investment through deploying better cost intelligence and lean • Use expertise of the pavement specialists during value-engineering • Implement a clear supplier reporting efficiency process on scheme completion. • Optimise network occupancy to balance customer experience and efficient delivery • Investigate potential savings and safety benefits through early pavement design phase. • Use of alternative methods (recycling process and products).

Conclusion: The Pavement Strategic Procurement Strategy (SPS) will ensure earlier engagement with 2 & 3 sector suppliers, and adopt a joined-up approach to sourcing, this in turn will help influence the pavement design bringing the pavement specialists in at the value engineering / early design stage, this will help identify pavement solutions, increase productivity and carbon reduction opportunities that will drive and deliver efficiencies. The strategy will lead to an improved alignment between all supply chain partners (Tier 1-3), and to NH goals and outcomes.

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Supplier Engagement

Pavement and Tier 1 Supply Chain Feedback

Procurement/Contracting

- NH to be clear on its requirements at tender stage.
- NH tend to overcomplicate their contracts/tenders.
- Need to simplify the process/pricing mechanisms but still ensure the innovations and benefits are captured.
- Frameworks past/present/future not fit for purpose for all schemes/business areas - (does not align with MP contract requirements). Its not just about Framework clauses, its risks, cost and management.
- Tier 1 budgets set by commercial on incorrect pavement assumptions impacting pricing of works/setting targets.
- Allocation approach works and allows engagement early on and reduces cost and time with running tenders.
- Look at Procurement based on value rather than lowest cost, Tier 1 need flexibility and to work collaboratively with the supply chain.

Operational Maintenance & Delivery

- Forecast in Demand is crucial and visibility of programmes as early as possible, better planning and enable commitment.
- The demand in terms of PSV, would need to determine the production via quarry/cost base, and there would be additional haulage costs applied when moving from quarry to relevant plant.
- Early contractor involvement is key to help shape the pavement design and bring those innovations and new pavement techniques. Historically being brought in to late to help shape the design and optimise the programme.
- Based on an average resurfacing scheme the percentages of spend across the supply chain is approx.
- 70% to 75% being in materials with Labour and plant 25% .

Workforce

- Explore Initiatives e.g. Sustainability Supply Chain School initiative to get facility for whole supply chain to have free access to training & development.
- Forecast and commitment of future demand allows for investment into the workforce, reduction in programme/lack of spend means resource needs to be re allocate or realised.
- Effects of Brexit :- drivers being approx. 80% European across some of the supply chain:- Minimal to no impact shown to date.

Plant Operations/material supply

- Two types of asphalt plant, Industrial batching plant -miles away rail feed or transportation
- Limestone/satellite plants/in quarry/ higher PSV Higher Heat.
- Demand for types of PSV need to be determined at early design stage as would need to assess production via quarry/cost base.
- Haulage costs increase when moving stone from quarry to plant.
- NH largest purchaser for night production where Local Authorities manly operate during day light hours. Most plants being 24hour running.
- Pavement quarries are generally located within a few miles of each competitor.
- A lot of stone PSV types are imported

Innovations

- Additives in asphalt could lower temperatures reducing carbon by approx. 30%.
- Different asphalt products available which could help achieve reduction of footprint.
- Warm mix set as a standard 140-degree, lower temp and less carbon and is more durable.
- Recycling methods available that can generate low carbon product.
- Through Value Engineering, opportunity to generate new alternative pavement options.

Efficiencies

- Efficiency opportunities can be driven through better programming to enable laying of larger quantities /tonnage per shift, increasing productivity.
- Early engagement with schemes can lead to significant productivity gains.
- Fewer loads would also increase carbon efficiency by reduction of haulage transport and fuel.
- Typical night shift 400 tonne in a 4-hour laying window.

Collaboration

- Early programming and collaboration with TTM can improve people and satisfaction to the customer by reducing site times and man hours.
- Challenges in past with designers getting buy in to move away from standard.

Design

- Tier 1 needs to break the cycle of how they work and put the pavement category/approach central to the development of the scheme.
- Pavement supply chain need to be brought in as early as PCF 1 and 2 and OD 3D process to allow optimise the programme design and outline alternative pavement methods/options.

Supplier Capability and Capacity – inc. industry accreditations

Link to detail

Supplier Name	Website	Key Service Offerings	Key Clients	Projects (recent past & present, HE in ***Bold Italics***)	Regional Presence	Accreditations
HUYTON ASPHALT LIMITED	https://www.huyton-asphalt.co.uk/	• Tarmacadam and Asphalt Surfacing • Adoption works / final surfacing • Preparation Works – Kerbs, Edgings, Ironworks adjustments Specialist Coloured Surfacing	• National Highways • Airports • HMP • Rail • Retail • Local Authorities	• C&P - Pavement Framework Lot 12 North West (Minor) • OPS - CWF CATMAN MINOR AREA 10	National	• NHSS 16 • NHSS 23 • NHSS 30 • Safe contractor (DQ1155) • Construction line Gold (72895) • ISO 9001:2015
BREEDON BOW HIGHWAYS LIMITED	http://breedonbowhighways.com/	• Road surfacing products and contracting service • Aggregates • Asphalt	• National Highways • Kier Highways Ltd • Local authorities	• C&P - Pavement Framework Lot 11 Midlands (Minor • C&P - Pavement Framework Lot 8 East (Minor) • Area 9 Asset Support Contract (ASC 9)	Midlands Eastern England	• ISO 9001:2008 • ISO 14001:2004 • NHSS 16
CEMEX PAVING SOLUTIONS LIMITED	https://www.cemex.co.uk	• Products • Concrete, Cement, Asphalt, • Aggregates, Mortar Products, Dry Silo Mortar, Screed, Concrete Pump Hire.	• National Highways • Local authorities • Utilities	• Pavement Framework Lot 10 South West (Minor) • RIP A63 Princes Quay	National	• NHSS 16 • ISO 9001:2015
COLAS LIMITED	https://www.colas.com/en/group	• Anti-skid Systems (subcontracted) • Cold Plastic Road Markings • Road Studs (subcontracted) • Temporary Road Markings (subcontracted) • Thermoplastic Road Markings (subcontracted)	• National Highways • Portsmouth Historic • Dockyard • Birmingham Airport • Local Authorities	• C&P - Pavement Framework Lot 12 North West (Minor) • C&P - Pavement Framework Lot 7 North East (Minor) • Area 12 – ASC • CWF - PAVEMENTS MINOR AREA 10 • Area 6 & 8 - CWF - Lot 8 Road Markings and Road Studs	Areas 6 & 8	• NHSS 16 • ISO9001:2015 • ISO14001:2015 • OHSAS18001:2007 • ISO 44001:2017
EUROVIA INFRASTRUCTURE LIMITED	https://www.eurovia.com/en	• Asphalt • Highways Maintenance • Small and medium infrastructure schemes • Surfacing	• National Highways • Local authorities	• C&P - Pavement Framework Lot 2 East (Major) • C&P - Pavement Framework Lot 9 South East (Minor) • C&P - Pavement Framework Lot 11 Midlands (Minor) • Area 3 – ASC • Area 9 – ASC	South East England	• NHSS 16 • ISO 50001 • ISO 14001:2015 • CLOCS • FORS
TOPPESFIELD LIMITED	https://www.toppesfield.com/	• Pavement / Surfacing / Asphalt • Roads maintenance	• National Highways • Local Authorities	• Pavement Framework Lot 8 East (Minor) • RIP M5 Oldbury Viaduct • A14 Cambridge to Huntingdon • RIP A63 Princes Quay	National	• ISO 9001 • ISO 18001 • ISO 14001
GALLIFORD TRY INFRASTRUCTURE LIMITED	https://www.gallifordtry.co.uk/	• Aggregates • Civil engineering • Concrete / Cement • Pavement / Surfacing	• National Highways • CCS • Dept for Education	• C&P - Pavement Framework Lot 7 North East (Minor) • Area 12 – ASC	National	• NHSS 16 • ISO 14001: 2015 • ISO 44001: 201

Key Supplier Risks

Risk type	Risk Description	Impact	Priority	Mitigation/Action
Supply Chain	• Over reliance on dominant suppliers could pose a potential risk to competition within the marketplace; including market sharing, price fixing & commercial collusion to artificially maintain high prices assert pressure on smaller competitors. • Lack of resilience & increased potential for supply pinch-points when pavement delivery is so wholly focused upon two main suppliers – limiting flexibility when constraints occur.	• Creates a duopoly between two dominant suppliers, suppressing innovation, competition & market development.	High	• Encourage main market players to include SME partner-ships in future tenders. Development opportunity to offer smaller suppliers a chance to gain experience of working on NH schemes. • Actively sponsor supplier development within the market-place through our client role to influence a more dynamic sector & place incentives for upward growth.
Innovation	• Core Pavement suppliers are traditionally structured as quarry-owners & therefore source their own asset material. This prompts potential resistance to change when technology advances & innovations are available to generate efficiencies. • Contract terms given by Tier 1 to contractors in lower tiers often do not mirror client NH), with risk pushed down & discouraging innovative approaches from being developed. • Opportunities to engage early at design stage are minimal, so works are at risk of being aborted or revised at increased cost & time if design principles are not scrutinised at the outset.	• Opportunities for cost, process & time efficiencies are missed. • Risk averse supply chain promoting little development. • Avoidable abortive work by not factoring in tier 2-3 expertise, increasing cost & time.	High	• Incentivise innovation in the framework to provide clear financial encouragement to work more effectively. • Enforce contract requirement to pass contract benefits to ensuing supply chain, maintaining pain/gain principles. • Include lower tiers in early design considerations so that that new ideas & expertise is factored into key decisions.
Capacity	• Increased investment by UK Government in large infrastructure projects, such as HS2, is extending demand & placing greater resource and plant constraints on the market. • Limited interconnectivity with non-Pavement suppliers to find better sequencing of works activities & shared efficiencies.	• Lack of skilled resource & plant available. • Inefficient deployment adding to time & cost.	Medium	• Government level visibility of competing demands to co-ordinate resource requirement & avoid pinch-points. • Adopt a works 'community' where suppliers on the scheme can actively engage in collaborative planning as the works progress.

Conclusion: Pre-emptive measures by National Highways in actively encouraging increased competition & growth in the market through procurement & contract based influences will deliver more innovation, resilience, effective supplier outcomes and greater work efficiency.

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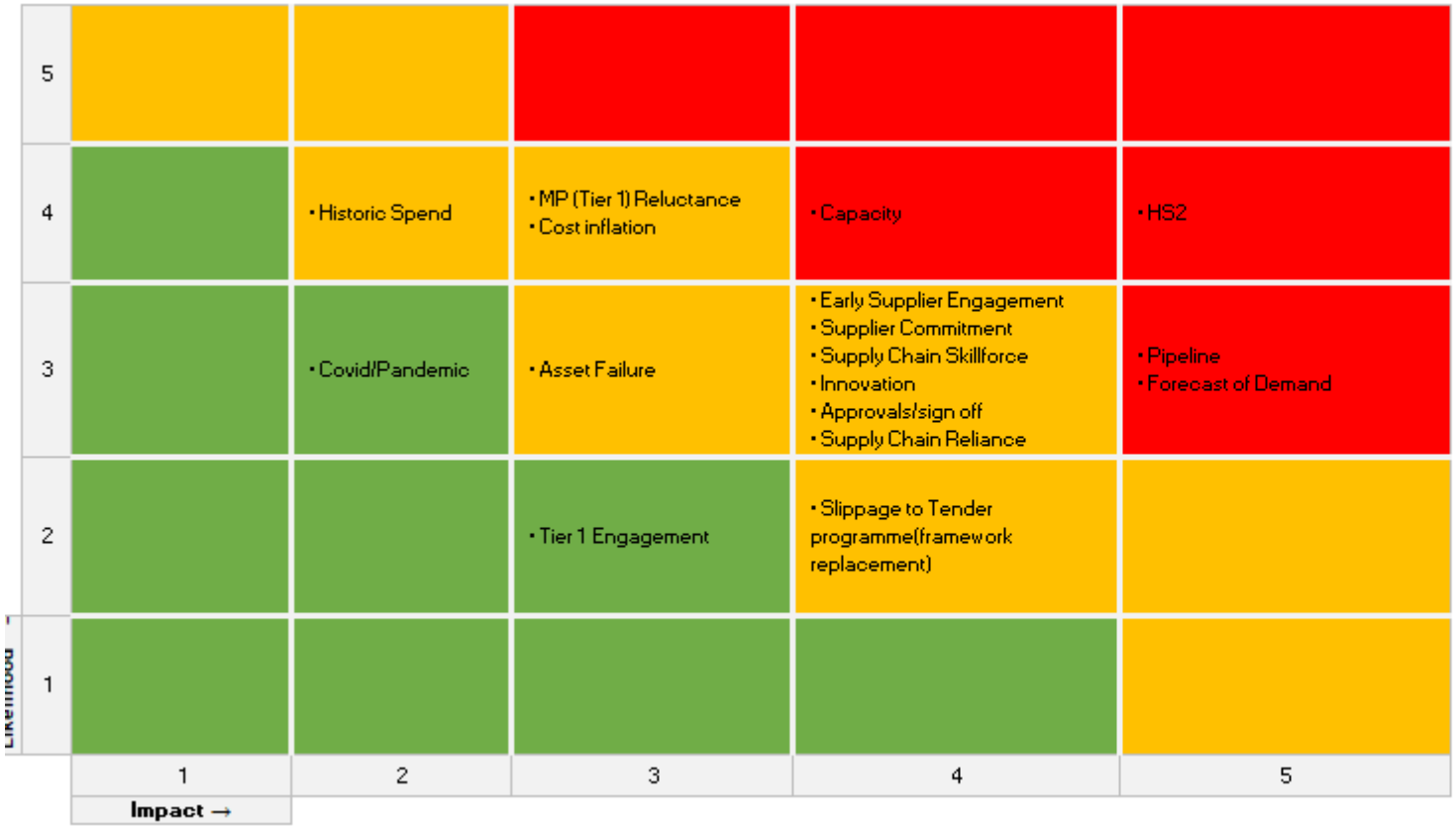
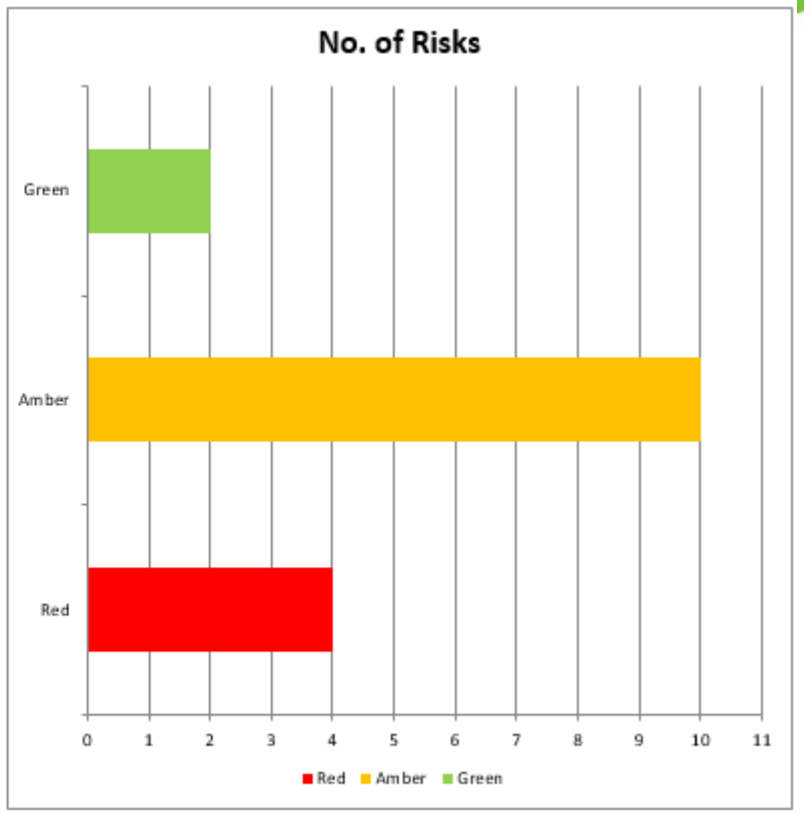
Risk Map



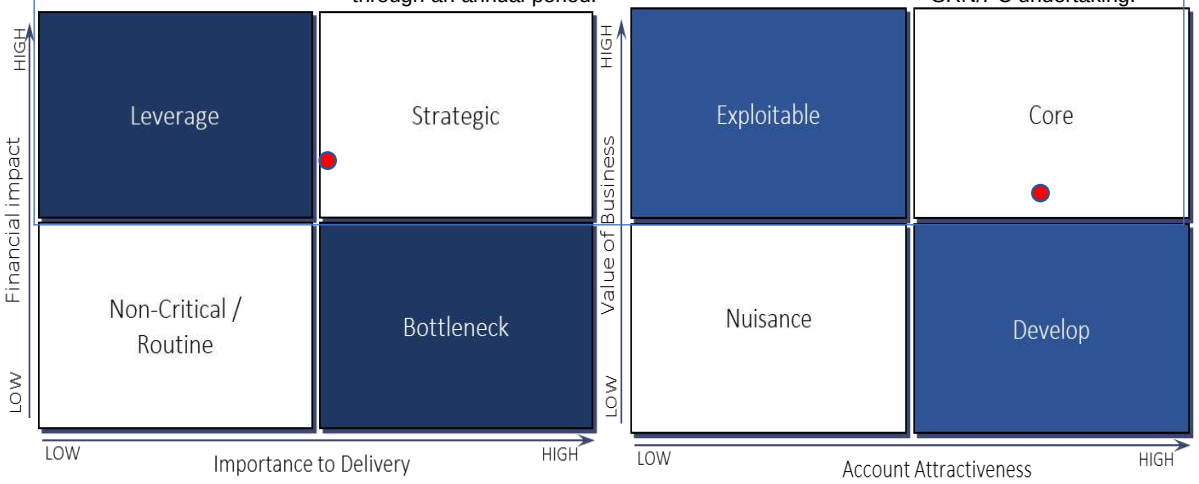


Conclusion:

- Visibility of future pavement demand is critical to enable the supply chain to invest in workforce and plan effectively. Early involvement at design phase is key as this will enable innovation and opportunity to develop alternative pavement options. Visibility of future pipeline should offer the ability to incentivise the supply chain. Risk mitigation plans are ongoing that will ensure delivery during framework transition.

Supplier Analysis

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
• Approach method to allocation allows early engagement and directly work with the supply chain. • Flexible supply chain to adapt and deliver emergency works or increase in delivery. • Technical ability and breath of knowledge within the pavement sector	• Internal understanding of Supplier quality promises from tender stage limited. • Onboarding pavement supply chain to late in the process makes innovation difficult/loss of efficiency opportunities. • Management at scheme and final account level differs across the business causing challenges that can be avoided through standardisation. • Framework being mandatory across MP causing blocker to engage wider market including SME's, and align contracts putting Tier contractor at risk. • Demand profile incorrect in the past, consent reduction in scope through an annual period.	• Incentivise innovations to drive industry H&S improvement. (Reduction in AFR) • Incentivisation on delivery and performance of carbon/environmental benefits KPI. • Measurement of vehicles, plant operations ability to reduce deliveries/transport to site- could help monitor carbon data. • Collaborative way of working and sharing of best practice of industry standards/improvements. • long term value considering whole life cost and total cost of ownership. • Value engineering at early design stages.	• Loss of funding and potentially loss of workforce • HS2 and other contracts effecting the demand/capacity within the market, pulling materials out of quarries • Lack of skilled workforce, ageing working population and rising cost of labor • Economic impact due to the Pandemic (Covid-19) • New alternative products and process presented through PEG, but no current way of procuring it. - currently procuring in a less efficient way • New innovative suppliers (recycling in situ providers) unable to directly contract as limited no experience on SRN/PC undertaking.



Political	Economic	Social-Cultural
• Roads Investment Strategy (RIS): defined objectives and efficiencies to be reached • Effect of pandemic on supply chain and future investment. • Environment to be established the effects of Brexit. • Meeting the SME expenditure goals	• Impact of GDP / Economic Growth/ Covid-19 would need to be a consideration • Roads Investment strategy • Stability of the Currency (£) • Resource use efficiency (planning to maximise cost efficiency) • Cost pressures (supply and demand led) • Industry cost factors (pensions, oil, equipment materials) • NH currently being one of the top clients , however industry is changing in terms of regulation and innovations and there is a need to adapt and invest to stay a relevant player within the market	• High customers expectations • Innovation driven environment • Strong Road Safety awareness smart motorway initiatives, communication plans/Safety awareness campaigns. • Increasing preference for employees with adequate skills, which would focus on increasing apprenticeships
Technological	**Legal**	**Environmental**
• Increase focus on plant interface technologies • New innovative technologies that have an impact to a safer working environment e.g.: , Vehicle Detection, cameras applied to plant, automated plant.(taking operatives of the SRN)	• Health and Safety requirements • Post Brexit Procurement rules and Competition law • National Highways policy, IAN's on fatigue and working regulations • Environmental protection standards and law	• Sustainable solutions considered in every sector of the business • Plant and equipment reduction/alternative methods • Environmental asphalt products and methods..

Conclusion:
Increased opportunities for National Highways to work with the Supply Chain to look at alternative pavement methods and products that will help increase efficiencies and help deliver our environmental targets. By exploring new innovative products working with SES that can help challenge the standard design, expand the life of the SRN and improve customer experience.

Innovation Opportunities VS Supplier Resistance

Innovative Techniques/Materials		Opportunity/Benefits	Resistance of Supply Chain
Warm Mix Asphalts (*compared to the use of conventional hot mix asphalts)*		▪ Less energy imparted on the mixture, resulting in environmental benefits including reduced carbon footprint. ▪ During installation, the lower temperatures used can reduce the exposure of construction operatives to fumes. ▪ Allow longer working windows and/or earlier opening to traffic with reduced risk of early life surface deformation (wheel path rutting), which is particularly relevant for thick pavement inlays that need to be placed and opened to traffic in short timescales.	▪ Resistance is Low. ▪ Resistance/challenge if there is a need to swap mixes during production (as cooling time required). ▪ Plant needs to be adapted for relevant asphalt mix - (will invest if commitment/assurance is there). ▪ Assurance of material of choice can deliver the low asphalt agenda.
Surface Course Asphalt Innovations (*recycling technique*)	 	▪ Incorporation of Reclaimed Asphalt Planing's (RAP) into surface course. ▪ Higher recycled contents in surface course currently being considered. Departures for higher recycled contents where quality control and early-life performance can be monitored are openly considered. ▪ Ground, recycled tyre rubbering incorporated into asphalt. Benefits of using this are that mixtures will have enhanced flexibility and prove low grade properties that are normally associated with expensive polymer modified binders. ▪ Technological advances in pavement material is extending durability even further.	▪ Reliance upon sourcing raw material from competitor organisation(s). ▪ Increased use of re-cycled material reduces need for quarries' raw product. ▪ Dominant supply chain, Approx. 80% of their business is material supply (plant distribution).
Recycling to Binder Course and Base Asphalt (*Materials)*		▪ Some cost/carbon savings whilst preserving natural resources. Many conventional hot mix asphalt plants are capable of incorporating 30% recycled content. ▪ Cold recycling techniques are permitted through the use of Clause 947 (in-situ) and Clause 948 (ex situ). ▪ Cold recycling utilises very high proportions of recycled asphalt material and therefore greatly reduces haulage to/from site. The avoided haulage and low energy input, results in significant carbon savings when compared to conventional hot mix. ▪ Innovations ongoing within the supply chain working with SMEs to deliver 'cold in-situ' trials and success within our direct supply chain using In Situ (AI Foam mix)	▪ Resistance is Medium ▪ Direct sourcing of raw material from quarries gives advantage ▪ Resistance to deliver via SME, pushing own products (and not NH needs)

Category Opportunities

Strategic Themes	Opportunities	Benefits	Obstacles
Supplier Relationship Management	▪ Continue to grow the supply chain through regular communication, communities, workshops. ▪ support engagement between RDP, SMA & SDF supply chain. ▪ NH to gain understanding of supplier risks that impact the wider business/industry. ▪ Opportunity to increase supplier relationship manager (SRM) engagement with all pavement providers.	▪ Develop stronger relationships with the supply chain, build on trust, drive improvement through delivery and commitment to working with NH to deliver the Net zero carbon. ▪ Commitment to deliver innovation and improve safety standards. ▪ Assurance to suppliers for long term relationships.	▪ Finding a way to encourage new suppliers/SME to engage and build experience where no experience or limited to working on SRN. ▪ Time to mobilise bring those suppliers on board/shadow more experience supply chain. (lack of commitment from existing suppliers). ▪ Reluctance from Tier 1 to engage.
Sourcing Strategy	▪ Incentivisation /alignment with all investment strategies. ▪ Embed category lead within MP supply chain/alliance community. ▪ Pavement tender/alignment with SDF and concrete roads. ▪ Ability to grow supplier market with SME . ▪ Direct sourcing for new pavement alternative methods and products.	▪ Reduction in costs. ▪ Pavement supply chain embedded at early design/ VE stage. ▪ Increase and deliver efficiency targets through productivity, synergising with TTM. ▪ Opportunity to shape pavement design/alternative methods.	▪ SDF model already in place, need to align but not all elements will work. ▪ How to bring pavement supply chain in at VE ▪ Pavement supply chain reluctant to provide solutions with no guarantee of programme/works. ▪ Designers to make that step change ▪ Finding a contractual mechanism for those smaller companies.
Continuous Improvement	▪ Sharing of best practice through a number of NH Communities , CM,AD and RIP. ▪ Working with SES and the supply chain supporting pavement trials/case studies. ▪ Support engagement, identify efficiency opportunities as part of the Asset Efficiency Group (AEG).	▪ Increased collaboration via MP/OD pavement community groups, sharing best practice and innovation opportunities. ▪ Building collaboration between Pavement supply chain, project teams and Tier 1 to enable lessons learnt, sharing across investment programmes.	▪ Some improvements not suitable across all regional areas i.e. recycling opportunities. ▪ Length of time to identify the benefits (MP scheme construction over long periods). ▪ Resistance from supply chain to share the benefits as it may lead to a competitive advantage.
Innovation	▪ Drive Innovation through early design stage. ▪ Work with and support SES to apply new and upcoming standards and drive new alternative pavement methods increasing supplier market/skill base. ▪ Mitigate/remove current and past challenges/performance and identify methods/products to improve and redact those risks.	▪ Outputs that can be achieved through innovation that will improve safety on the SRN ▪ Opportunity to generate more efficient ways of working that will improve customer satisfaction. ▪ Access to new technologies to improve safety and performance and the end product.	▪ Suppliers may not openly share innovations where there is no commitment of works. ▪ Demand forecasting- need confidence in the pipeline of works to help drive commitment to invest and deliver innovation. ▪ Supply chain trying to force/sell own products
Performance Indicators	▪ Develop performance indicators that reflect the works to be delivered i.e. Defect free, outputs/efficient working. ▪ To monitor and drive carbon targets. ▪ KPI for submission of final account documents 12 weeks after package order completion certificate issued.	▪ Better alignment to metrics ▪ Increased safety and performance ▪ Captures true performance on site ▪ Allow AD scheme commercial to send cost data to commercial central on time.	▪ NH need to find the right incentivisation model ▪ Need to fully understand the supply chain to highlight what can drive the biggest impact. ▪ In house performance monitoring needed.

Recommendations

Stratgic Opportunities	Description	Recommendation See next slides for Pavement Strategy options
Supply Chain and Stakeholder Relationship Management Management of the supply chain/visibility of the market	**Supply Chain Management, engaging directly supporting National Highways Main Header Contracts:** ▪ Enabling the ability to enhance visibility & insights of the pavement supply chain methods, practices and solutions. ▪ Prioritise significant risks with the ability to develop levers to aid management of scheme development and on site performance. ▪ Allows transparency and build supplier relationship/communications	▪ PSA- 01 Continued delivery via existing Pavement Framework ▪ PSA - 04 Pavement Category integrated and supporting SMA Pavement framework alliance. ▪ PSA- 05 Alignment of strategies across all MP investment programme with Category Leads integrated into project working groups supporting LTC,RDP etc. ▪ PSA-10 Contract management and community engagement to support Operations (SDF) ▪ PSA-07 Implement Cost Reduction Process ▪ PSA-11 Improved Performance/KPI metrics
Standardisation Driving synergies, Material designs and safety improvements/incentives	**Standardisation across investment programmes** ▪ Standardisation with ability to drive synergies and commercial/environmental benefits. ▪ Alignment of commercial and contractual benefits (cost capture) ▪ Co-ordination across regional areas . ▪ Ability to standardise move to more environmental material options (Warm Mix)	▪ PSA-02: Pavement Supplier community ▪ PSA-03: Plant Interface working group ▪ PSA-06 Pavement Optimisation Group (POG) ▪ PSA-11 Improved Performance/KPI metrics
Working community Delivery via mature supply chain	**National Highways directly manages pavement supply chain** ▪ Approach identifies capable and high level performing supply chain with the willingness and drive to contribute and deliver NH objectives. ▪ National Highways ability to monitor and improve quality, safety and performance. ▪ Realisation/sharing best practice and application of Health and safety solutions	▪ PSA-02: Pavement Supplier community ▪ PSA-06 Pavement Optimisation Group (POG) ▪ PSA-10 Contract management and community engagement to support Operations (SDF) ▪ PSA-11 Improved Performance/KPI metrics
Innovation/Environmental solutions Early contractor Involvement	**Incentivisation across the supply chain** ▪ National Highways to encourage and reward high performing suppliers ▪ Ability to drive innovation via value engineering and deliver opportunistic material options ▪ National Highways to drive application of new standards and alternative methods.	▪ PSA-06 Pavement Optimisation Group (POG) ▪ PSA-07 Implement Cost Reduction Process ▪ PSA-08 Innovative Materials and Techniques ▪ PSA-09 Carbon Reduction

Strategy - Short Term

Pavement Strategy Approach	Description	Benefit	Action
PSA-01 Delivery via existing Pavement Framework for OD (AC/AD) and MP (RIP)	▪ Current NH contractual model that provides access to materials, plant and labour to carry out pavement works (milling, paving, renewal etc) ▪ 11 suppliers listed on the framework. ▪ Pavement community fully embedded into NH CWF community across regions, key members of pavement efficiency groups.	▪ Default Works allocation ▪ Provides direct access to supply chain that allows opportunities for ECI. ▪ RIP allocation undertaken for RIS 2 period of all RDP packages to ensure delivery with opportunity to continue ECI through PSC until construction commence.	▪ Put in place pavement mitigation plan to ensure continued delivery for RP2/transitioning to the pavement strategy/contracting options. ▪ NH to identify incentivisation methods to drive change and direct use new methods like in situ and ex-situ pavement recycling. ▪ Ensure delivery to time and increase opportunities by engaging supply chain much early on in the design process.
PSA-02: Pavement Supplier community	▪ Established supplier community, building relationships and linking in with RIP,AD Community and supplier forums. ▪ Build capability to enable decision making which delivers better whole life value and performance outcomes. ▪ Grow capability of the market place allowing more mature supplier members to share and upskill the supplier base (especially in respect to SME).	▪ Access to manage capability & capacity of the supply chain to deliver RP2. ▪ Collaboration with suppliers, providing forecast of spend that encourages investment in people, facilities and innovation. ▪ Lessons learnt and best practice shared across all regional areas and investment programmes. ▪ Community can help drive change engaging with SES/designers through ECI which will help identify and deliver greater efficiencies and environmental successes.	▪ Continue to maintain and manage existing pavement community, with potential to increase members with future procurement opportunities. ▪ Ability to increase collaboration across the wider business (CIP/SDF etc). ▪ Encourage early engagement within the business and utilise the community relationships to unlock value and efficiency opportunities. ▪ Consider how we can impact change during early design. ▪ Hold community members accountable for key actions that will help deliver NH goals. (Carbon and safety targets).
PSA-03:Plant Interface working group	▪ Established working group to look at real issues in connection with transport of equipment. ▪ Improvements to loading and unloading, security of loads, site access and safe on site storage/parking of plant and equipment.	▪ Sharing of best practice across the supply chain, not just with pavement supply chain but wider tier 1,2,3. ▪ Opportunity to mitigated the risks in connection with same vicinity working and improve on site interaction with other contracting/supply chain partners.	▪ Supplier led working group to be enforced by April 21 ▪ Development of term of reference and key objectives that will generate results. ▪ Reduction in plant interface incidents across the networks and suppliers AFR.

Strategy - Short to Medium Term

Pavement Strategy Approach	Description	Benefit	Action
PSA-04: Support SMA Pavement Framework	▪ Collaboration with SMA Supplier Relationship Leads, requirement to align an incentivised supply chain and imbed pavement expertise into the Alliance. ▪ Key prioritisation that supports growth in the market with contractual commitments of 35% delivery via SME. ▪ The alliance will provide the opportunity to allocate on a national and regional approach, based on supplier capability and allow pavement suppliers to be brought in during value engineering that will help influence development phase.	▪ To support and deliver to Pavement and SMA alliance goals ,objectives and values. ▪ Driver to increase efficiency targets through productivity & reduce cost. ▪ Early contractual involvement that will be able to help optimise and innovate the programme. ▪ Alignment with Header contracts/working directly under the alliance (not under NH framework contracts). ▪ Mature and experience supply chain working and delivering to NH imperatives.	▪ NH Pavement Category group lead to be imbeded into the SMA community. ▪ Support the implementation process that will manage delivery of SMA and pavement Stratgic objectives. ▪ SMA to provide Category Lead with live (or quarterly) data: visibility of supplier allocation, work package awards (supplier & price), actual cost, efficiencies & supplier performance. ▪ Category lead to support the SMA to challenge and encourage the supply chain to bring forward innovation around environmental benefits improvements to safety and reduce impact to the customer by optimising the working window.
PSA-05: Align Strategies for MP Investment Programmes	▪ Ensure RIP, CIP & LTC also align to MP SMA/Pavement strategy objectives. ▪ Move away from HE frameworks for MP- unlocking value opportunity via tier 1 contracting**.** Sourcing pavement services (supply & Lay) via Tier 1 Header contracts for RIP CIP/LTC . ▪ RDP – delivery via existing pavement arrangement for schemes already allocated. ▪ Engagement with key stakeholders within LTC and CIP to identify and link strategy/approach to maximise supplier intelligence. ▪ Support investments programmes working with supply chain to maximise pavement opportunities and optimise the programmes through early engagement.	▪ Collaborative approach delivering increased efficiency to meet NH targets with ORR. ▪ Tier 1 sub-contracts and community approach– allows alignment to incentivisation model & mechanisms in their Header contracts (i.e.. SMA, RDP , CIP (LTC) & A303. ▪ Direct access to the supply chain to allow early engagement to help shape design.	▪ Continue to engage with SSCG DIP representatives via pavement regular community engagement check-ins. ▪ Identify and agree baseline cost reduction targets: ▪ Develop, working with relationship leads a defined process that ensures clear linkage between strategies and ensure key objects are delivered. ▪ Work with MP C&P teams to understand and define commercial and procurement requirements under the main header contracts- supported by the category strategy.

Strategy - Short to Medium Term - Continued

Pavement Strategy Approach	Description	Benefit	Action
PSA-06 Pavement Optimisation Group (POG) **Delivery through Lean practices** (previously known as PEG)	▪ Collaborative working within the road construction industry. ▪ Using a Lean approach to identify and test new opportunities, then trial, implement and share initiatives that will create measurable pavement efficiencies to the benefit of the supply chain, NH and the end customer. ▪ Build awareness and understanding of repeatable problems and identify key themes to tackle that will help the development of project outline / Quad of Aim. ▪ Analyse and understand data collected	▪ Support the delivery of Pavement Productivity Improvement project which will deliver tangible pavement productivity benefits. ▪ Knowledge sharing, development and implementation of industry manuals/packs ▪ Solutions can be identified that would address root causes to the problems ▪ Will help drive innovations that will help deliver to NH efficiency targets.	▪ Pavement efficiencies are to be recorded around the effectiveness processess and performance of productivity with forecast of £63,500,202 efficiency value for RP2. ▪ Engagement via the group to further develop value stream opportunities. ▪ Be a key driver and Input into a number of key workshops that will help achieve the following objectives: ▪ 1-Identify opportunities and undertake ease benefit analysis (May 21) ▪ 2- Identify deliverables ▪ 3- Develop and agree action plan/rollout.

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Strategy- Medium to Long Term

Pavement Strategy Approach	Description	Benefit	Action
PSA-07 Implement Cost Reduction Process	▪ Baseline, monitor and demonstrate cost reduction - work with all stakeholders to increase productivity and efficiencies. ▪ Engagement with reginal delivery and commercial teams to help identify efficiency opportunities. ▪ Active members of pavement efficiency group (PEG) which helps facilitate supply chain efficiency opportunities.	▪ Demonstrates cost reduction. ▪ Helps motivate increased productivity and efficiency. ▪ The Central Efficiency Group (CEG) will be able to make central claims utilises the pavement framework.- this should make capturing of efficiency and savings easier to maintain.	▪ Engaged and linked in via Roadworks cost reduction lead on 'cost reduction' process and model – started using this as our reporting process. ▪ Roadworks cost reduction lead embedded into the Cost Reduction Working Group. ▪ Contributing to ORR efficiency submissions .
PSA-08 Innovative Materials and Techniques (Including decarbonisation)	▪ NH to encourage designers to work with pavement supply chain to improve standard design and move away from traditional materials to new alternative material methods and techniques, like warm asphalt, Increase recycled asphalt content, In Situ and Ex Situ recycling. ▪ Commitment from the supply chain to support NH improvement to standards.	▪ Moving to new pavement methods like In Situ and Ex Situ generates benefits around the management of tar contaminated material, leading to environmental benefits. ▪ Use of warm Mix standard no longer needs a departure and uses technologies to reduce temperature of asphalts.(will have a efficiency and carbon benefit) ▪ Early engagement with pavement community allows for innovation to be applied.	▪ Identify key incentivisation methods to encourage/drive the supply chain to adopt change in working practice. ▪ Deliver innovation through community approach. ▪ Work with OD, SES, CD&A and procurement lead to identify direct sourcing opportunities. ▪ Continue to seek out new alternative pavement methods within the supplier market. ▪ Work with SES, to link our supply chain with scheme designers.
PSA-09 Carbon Reduction	▪ Support all MP and OD investment programmes (SMA,CIP,RIP,SDF) and our supply chain community to identify and develop solutions, including new pavement methods and sustainable sourcing. Pavement supply chain to support realisation of **NH Net Zero Carbon.**	▪ Improved environment and contribution to NH carbon-neutral commitments. ▪ NH increase knowledge and experience bringing new working methods onto the SRN. ▪ Pavement supply chain being implemented into key forums/industry strategies (PID59).	▪ Work with all investment programmes and MP Transformation Delivery Programme and supplier community to improve sustainable souring solutions to help meet NH targets. ▪ Link in and support Industry Strategies (PID 59): Sustainable Sourcing - Zero Carbon & Waste. ▪ Collaborate with SES and OPS delivery to identify process and methods to monitor carbon targets through scheme delivery.

Strategy- Medium to Long Term-continued

Pavement Strategy Approach	Description	Benefit	Action
PSA- 10 Pavement Framework (Replacement) Delivery for OD/SDF alignment	• Development of new contractual model that ensures delivery of pavement solutions, supply and lay of materials across the SRN. • Operation Directorate will deliver the pavement programme in conjunction with use the Asset Delivery Scheme Delivery Framework (SDF) and Concrete main header contracts, via a new pavement framework model contract. • OD Pavement working group identifying key business need/focus areas that will strengthen and be built into the commercial and procurement strategy that will ensure right model is placed and smooth transition and delivery is met.	• Direct access to the pavement supply chain contracting directly to NH. • Earlier engagement will enable value and drive efficiency. • Pavement supply chain community imbeded into NH CWF/SDF communities. • Opportunity to expand the pavement supply chain further gaining accesses to more specialist products and methods • Providing opportunity for SME's. • Ability to incorporate requirements to deliver NH environmental targets. • Align and work in connection with SDF and Concrete to enable OD smooth delivery of programme. Based upon the above benefits recommendation that placing a framework with allocation model will help identify the Monterey benefits due to time and money being saved then undertaking individual tenders per scheme.	• Continue to work with key C & P and OD stakeholders to identify robust procurement options (commercial & contractual) and framework structure. • Identify key incentivisation and performance metrics working with key internal stakeholders including SES, customer performance and delivery.. • Ensure pavement strategy is aligned, delivered through commercial and procurement strategy. • Work with commercial leads to define clear robust commercial model and how costs savings can be captured through scheme delivery. • Pull input from performance & EDI to meet the 10% social value targets • Undertake and lead the implementation of the strategy through to procurement sourcing, supporting and delivery contract development and tender process.
PSA-11 Improved Performance/KPI metrics	• Delivering to business requirements around performance including efficiency and key performance indicators (KPIs). • Supply chain accountable for their performance that will be demonstrated through efficient delivery, optimising performance. • Improve safety, quality and sustainable performance – driving towards the % KSI target. • Encourage innovation through incentivisation.	• Clear KPI would allow for increasing capability within the supply chain. • Improvements that would reduce impact to the customer. • Collaboration between the supply chain, SES and wider sector sharing best practice/ introduce new ways of working to improve delivery and the customer experience . • Pavement supply chain imbeded into SMA (alliance), and wider MP/Pavement community.	• Working in collaboration with Procurement Delivery, customer performance and OD delivery identify key performance metrics that will be contractually incorporated into the new OD pavement contract. • Link in with SDF and concrete programmes to align performance metrics and incentivisation methods to ensure realistic and achievable.