

# Structural Steel

## Strategic Procurement Strategy (SPS)

Sally Goding - Category Group Lead

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# Executive Summary - Structural Steel

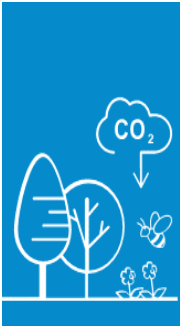
£13.5m  
Cost  
Reduction  
Saving

## Summary:

The elements of Structural Steel are delivered by preferred delivery partners within each invest programme with Tier 1 Main Contractors managing the delivery via extended supply chain subcontractors. Driving supplier performance through the steel sector and cultivating innovation from specialist steel suppliers, wider industry and other industries to meet our goals. Safety, carbon reduction, customer experience and delivering better value are the key aims of the Structural Steel strategy.



## Challenges:



- **Safety:** Drive for new technologies and modern methods of construction to improve safety practices.
- **Implementation:** Driving change can be difficult with Tier 1s needing to support the lower tiers with innovation – efforts are duplicated and data is poor. Recognising quality, safety and customer impact are all factors.
- **Supply:** Opportunities not consolidated – demand & forecast data poor – more work to provide visibility to support supply chain.
- **Demand:** Currently demand planning is weak offering little useful information to the business or our partners.
- **Carbon Targets:** Risk of not achieving our targets unless we actively seek out change, speed up trials and implementation.
- **Early Engagement:** Early engagement of project management & design team with suppliers – Development of a Steel Community needed.
- **Collaboration:** Establishing working groups across the sub-categories in Major Projects (CIP, RIP & SMP), Operations Directorate and LTC.



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



- Improved Safety through Structural Steel products and programme planning. Taking what we implement with CIP with and sharing best practice with ALL investment programmes sharing cross category.
- Effective demand planning to unlock market opportunities which could benefit all investment programmes
- Continue to drive implementation of change through the various working groups, Innovation Reapplied, SES & identified Investment Programmes.
- Increased engagement with suppliers through the Supplier Communities set up for specific sub-categories.
- Increased focus on introducing low carbon technology, such as stronger raw material within Steel & applying modern methods of construction and DFM along with the emphasis on carbon reduction and sustainability when assets are made and maintained.
- Delivery of Structural Steel cost saving opportunities described in this strategy within the RP2 period - £112.6m spend

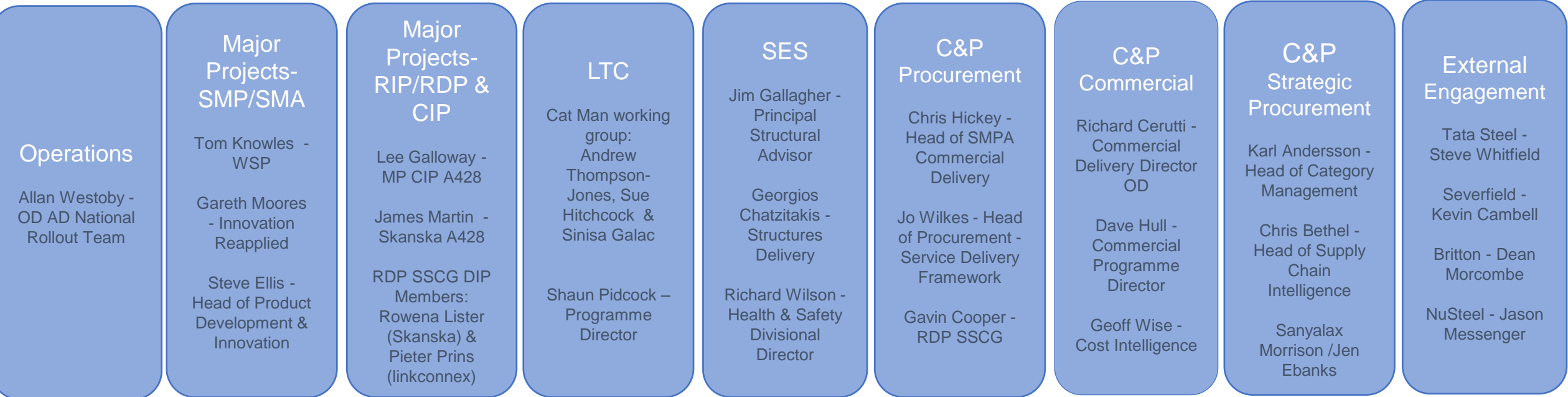


# Engagement Matrix for Strategy & Approach – Structural Steel

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## Stakeholder Engagement

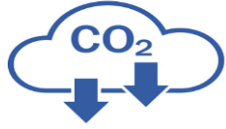
A record of communication and stakeholder engagement can be found here - SHARE link to Stakeholder Engagement Plan:  
<http://share/share/llisapi.dll?func=ll&objaction=overview&objid=88153916>



Business Area/Investment Programme:	Individual & Role:	Review	Date:
Executive Team – Panel Chair	Malcolm Dare – Executive Director C&P	Online Review and sign off	23/12/21
C&P Leadership	Sanyalax Morrison	Online Review and sign off	23/12/21
Executive Team	Peter Mumford – Exec Director Major Projects	PP. By Malcolm Dare online review and sign off	23/12/21
Executive Team	Mike Wilson – Exec Director SES	PP. By Malcolm Dare online review and sign off	23/12/21
SRO Name	Lee Galloway – A428 Project Director	Circulated for review	29.11.21
MP – SMP/SMA Leadership Team	David Bray – SMPA Director	Circulated for review	29.11.21
C&P Leadership Team	Sanyalax Morrison – SPD Director & DD Directors	Circulated for review	29.11.21

# Key aims of the Strategy

£13.5m  
Cost  
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Saving



**CO2 reduction** is pivotal to meet NH government targets. By unlocking opportunities within CO2 reduction it will enable efficiencies to be realised across a variety of areas including safety, time and savings opportunities. Early engagement of the supply chain and collaborative cross functional working will support the drive to meet net zero carbon efficiencies.



**Demand planning** maximise buying opportunities and minimise market risks. Ensuring all schemes benefit by working on total requirements. Getting this right is imperative to unlocking the potential of other opportunities. Aggregation opportunities to buy when prices are low. Especially with collaboration of other Category Leads.



**Shaping the Market** engage the supply chain with Category Management to embed the requirements of NH into the supply chain. Optimise expertise to encourage continuous improvement and identify KPIs that will support improvement.



**Innovation** Early collaboration with supply chain with designers and SES to optimise solutions for structural steel. Explore new technologies, materials and standards and ensure Total cost of ownership from cradle to grave to support solutions to produce savings, value add efficiencies. Working groups through supplier community engagement.



**Supply Chain Performance** improve delivery and reduce safety incidents across NH network. Improve quality to increase customer satisfaction.



**Standardisation** – optimise standard solutions through cross-functional collaboration with SES, Supply Chain and Designers, and support with internal stakeholders to ensure wider NH requirements and needs shared through Innovation Reapplied and the DPC.

By working with the strategy sponsor CIP (A428) supported by SES we look to continuously improve NH safety, environmental impacts, increase productivity and produce long term efficiencies for the remaining period in RIS2 and plan for a more efficient RP3. Total life cost and beyond with measurable efficiencies and cost reductions.

Potential savings of 12% in RP2 across all investment programmes and Operations that equates to £13.5m cost saving.

# How will this deliver to the Business Objectives

£13.5m  
Cost  
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Saving

The problem statements/challenges addressed within Structural Steel Strategy can be summarised in National Highways core values:

- **Safety** - Reducing the number of hours road workers are exposed on the SRN by reducing the number of interventions required.
- **Customer Service** - Customer experience improved by minimising road closures and disruption on the network, reduced closure periods and increased productivity as well as focusing on the Social Value agenda.
- **Deliver Efficiencies** – Total cost benefit through innovation and collaboration with cross-category support, working/sharing of best practice between Structural Steel category, Tier 1s and Steel Supplier Community. Modern Methods of Construction, design for manufacture, delivery installations and logistics.
- **Innovation:** Challenge standards and driving/enabling innovation by promoting net zero carbon to delivery carbon targets.

Directorate	Benefit/Objectives	Short	Medium	Long term
<b>Operations</b>	Develop solutions that meet future maintenance needs.	Engagement with Operations Directorate to understand Structural Steel concerns and explore innovation solutions with supplier community.	Engage with SDF on implementing best practice solutions and NH Carbon strategy.	Influence solutions for the SDF into RP3.
<b>Major Projects</b>	Support tender opportunities for M42 gantries, and Structural Steel. Engage A428 then later A66 for RIP – consider Safety, Modern Methods of Construction, Delivery, Customer Service (shorten timescales) and Carbon reduction.	Leverage supply chain through early engagement with Tier 1s and Designers – Viaducts for A428 and bridge beams for A66 – innovation & collaboration for carbon and logistics delivery.	Early engagement with Tier 2/3/4 and link with Tier 1s and Designers – A303 requirements. Engage Supplier Community and Structural Steel Improvement project to provide innovation/carbon reductions.	Work with RDP DIPs to 'Make the Market' by shaping the Steel Sector and supply chain to safely deliver opportunities and increased efficiencies, particularly around Carbon reduction.
<b>LTC</b>	LTC requires specialised structural assets (ie. tunnel systems & large bridgeworks). Engagement to understand Structural Steel concerns.	Explore innovation with supplier community. Develop and establish solutions that meet future need.	Value stream mapping for LTC to identify key steps & explore potential opportunities to add value.	Strategy for specialised structural assets (ie. tunnel systems & large bridgeworks). Procurement initiatives for RP3 and beyond.
<b>SES</b>	Reduce the number of departures. Provide opportunities to increase innovation and reduce carbon. Continuous improvement, align aims to focus on Safety, Carbon, Innovation, and Productivity.	Work cross-functionally with other categories to support steel requirements and identify Carbon measurement baselines.	Challenge safety standards for material specification ensuring whole life costing is considered. Explore and identify KPI for measuring opportunities.	Continuous improvement to ensure achievement of corporate environmental targets for 2030 manufacture targets.

# Our Ask/Request

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Area	Requirement and Accountability
<b>MP</b>	Project Managers and Tier 1s to engage and implement innovative ideas on A428, M42 and A66 (A) Concrete Vs Steel and High Tensile Steel opportunities (R) Support demand planning & pipeline for SMPA & RDP schemes – reapply best practice, including forward look on CIP A303 (R)
<b>OD</b>	SDF regional framework managers to engage and share Lt and supplier performance data (R) Ensure themes of the Structural Steel Strategy are considered and acted upon where applicable (A) Any future support if separate procurement solution is required (C)
<b>SES</b>	Provide support for standards vs materials and support steel innovation/opportunities (A) Review material standards to support TCO and DFM opportunities (A) Provision of baseline data for Carbon Contribution for Structural Steel products (R) SES required to be fully engaged with category areas and support community technical information (C)
<b>C&amp;P</b>	Commitment to ensure benefits and best practices derived from strategic innovation and that improvements are implemented to support the business (R) Support recommendations/solutions identified in strategy and Category Leads across all investment programmes (A)
<b>LTC</b>	Engage and identify LTC requirements – development opportunities (R) Agree and implement solutions (A)

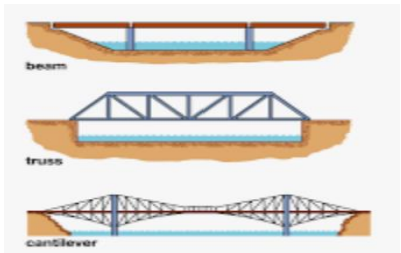
Note: A = accountable, R= Responsible, I = Informed, C = Consulted

# Structural Steel

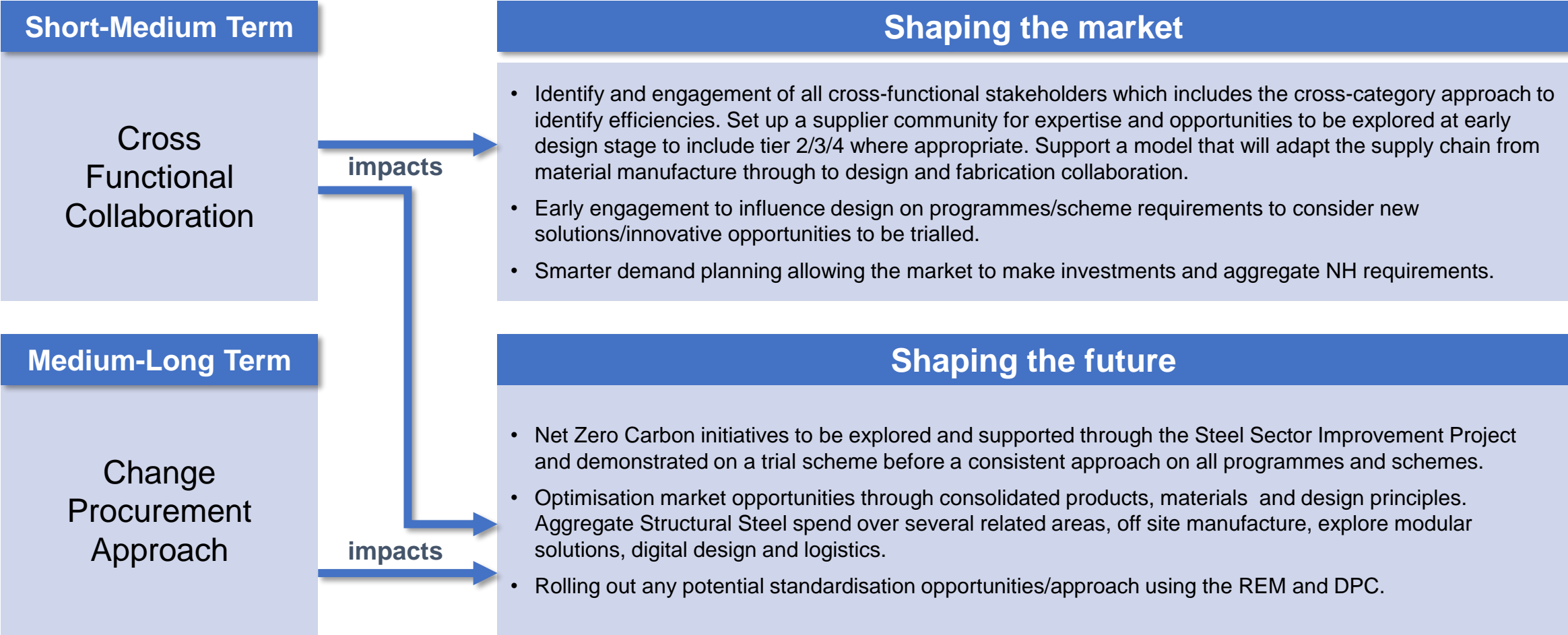


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- **Structural Steel is a category of steel used for making construction materials in a variety of shapes:**
  - Chemical composition and mechanical properties, including shape, size, strength and storage practices, are regulated by standards in most industrialised countries (eg. bridge beams/decks & viaducts).
  - Structural Steel is 100% recyclable and one of the most reused materials in the world.
  - Steel can be classified as carbon steel, high-strength low-alloy (HSLA) steel, heat-treated carbon steel, and heat-treated constructional alloy steel.
  - Structural Steel under the prolonged influence of operational factors such as pressure, temperature, cyclic loads, radiation, and the environment can lead to embrittlement as a result of thermal aging and fatigue as well as corrosion damage.
- **Structural Steel has relatively high tensile points, ductility and presence of alloys that increase strength and machinability:**
  - Normal strength yield stress is about 240 MPa, tensile strength about 360 MPa. High strength: Yield stress is about 340 MPa, tensile strength about 470 MPa.
  - A36 and A572 are two structural steel grades typically used in building construction.
  - Structural Steel has a higher carbon content than mild steel and is fabricated through heat & mechanical processes, whereas mild steel can be moulded into explicit structures by means of machine, shaper and boring machines.
  - Rebar is melted scrap, so it's not possible to tell what the carbon content is most of the time
  - The recycling of different grades has varying costs, stainless steels are generally more expensive than carbon steels – this is due mostly to the addition of a variety of alloying elements in stainless steel, including chromium, nickel and manganese.
  - On average around 85% of steel, at the end of it's first useful life, is recycled (over 99% of steel from scrap cars is recycled and 99% of structural steel is recycled or re-used when a building is demolished).



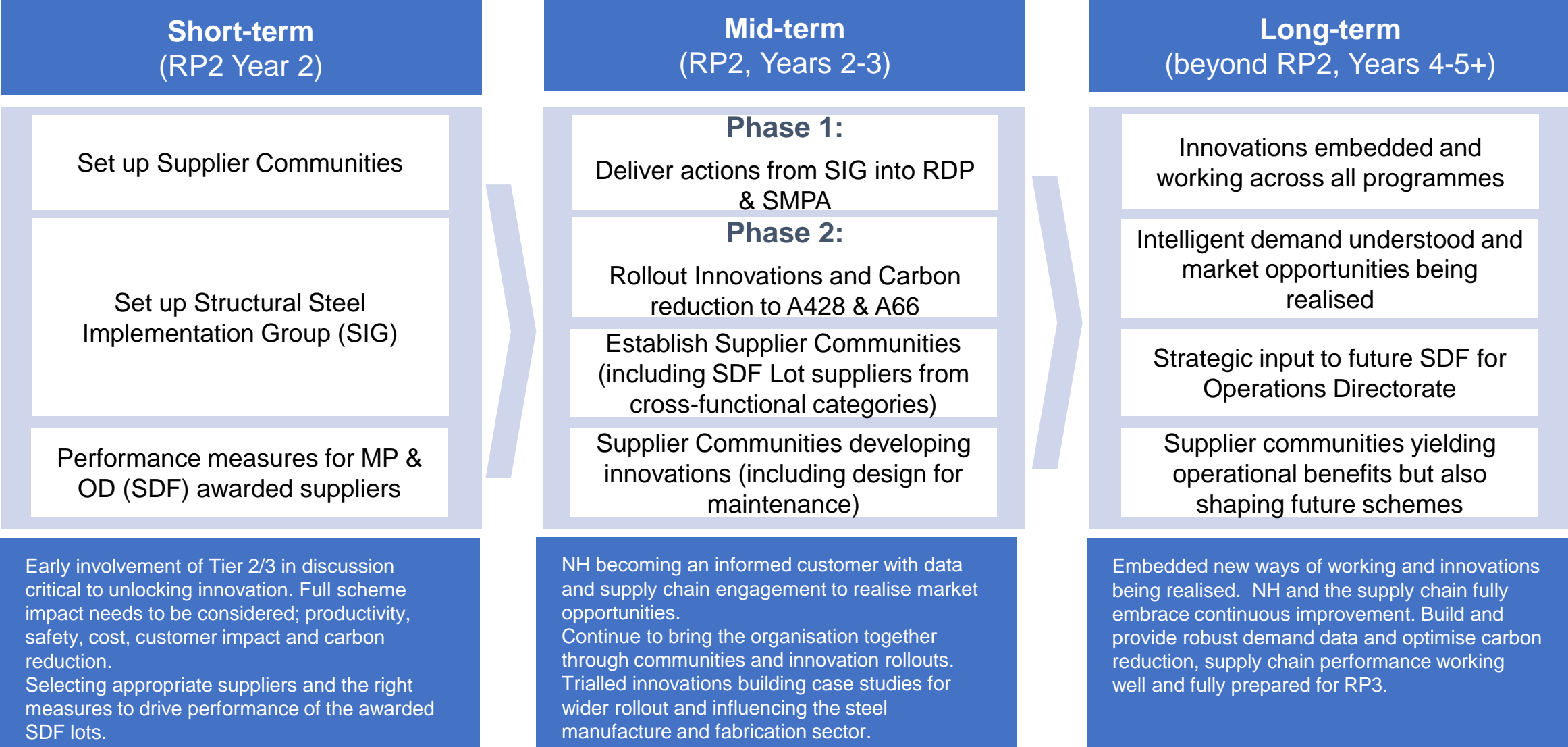
# Snapshot on our future vision



This is a high level snapshot that will develop as further opportunities and innovations are explored and value mapped for efficiencies across all of our imperatives.



# High-level Plan to deliver Goals



# Rollout of Structural Steel solutions

Carbon\*\*

**SS01  
Gantries**

**SS02: Bridge  
Beams/Decks  
and Viaducts**



**Cross-category element efficiencies**

Standardisation through DPC and Innovation Reapplied will be the key focus to achieve cost savings, time efficiencies and carbon reduction. DFM reduction in manufacture process. Customer satisfaction with reduction in road closure time. Carbon efficiencies.



**Trial & embed early engagement and designs across supply chain**

Support CIP with procurement of A428 structural steel elements – engage the extended supply chain early at design stage to investigate material, flatten pricing and obtain efficiencies of scale .



- **Monetary Benefit: see the Gantries Strategy**



**Monetary Benefit: £7.9m**

Improved strategic approach, basis for future innovation, leverage of suppliers' expertise and quality, increased productivity more alignment of NH and suppliers' objectives, drive improvements and innovation.

- At this stage savings are not greatly achieved as this is the testbed stage – outputs will enable savings medium to long term as improved ways of working and carbon reduction is implemented NH wide.

\* Monetary benefits shown here are based on £112m overall RP2 forecast for Structural Steel with rollout of these solutions across all major investment programmes  
 \*\* Carbon is to be considered across all of these themes it should formulate the basis of design, supplier performance, innovation, market options and standardisation

# Rollout of wider category Solution

Carbon\*\*

**SS03  
Carbon Reduction**

**SS04  
Support Roadside  
Technology  
Category**

**SS05  
Support Concrete  
Structures Category**

**SS06  
Support Road  
Restraint Systems  
Category**



**Carbon Baseline and Measurement**  
Support and meet the NH target for Net Carbon Zero plan by 2040 for manufacture and production.



**Link with Digital Services**  
Procured through IT Roadside Technology includes signs & signals, CCTV masts and lighting columns – support material innovations & raw material aggregation.



**Link with Concrete Structures**  
Steel sheet piling and retaining walls (rebar in concrete structures) spend covered under this category. Support Cat Lead with through Steel Supplier Community.



**Link with Road Restraints**  
Material intelligence and innovation opportunities supported by implementation group and Sector Improvement Project P3 Carbon. Support Cat Lead with through Steel Supplier Community.



**Monetary Benefit: £5.6m**  

- Contribution from Structural Steel forecast spend on bridge beams/decks & viaduct WBS elements.



**Monetary Benefit:** claimed by individual category inline with their identified WBS elements.  

- Provide support/expertise on steel production and fabrication, and carbon reduction.



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# Next steps

£13.5m  
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Actions	Timeline
Final review of Structural Steel Strategic Procurement Strategy (SPS) and CCF Stage Gate 2.	Dec 21
Progress Implementation Group and agree plan timeline for opportunities within CIP (A428) and RDP (A66). Pull SES into supplier community around Structural Steel to establish early engagement sessions with business areas and extend supply chain.	Jan/Feb 22
Refine demand data and spend profiles for use in cost reduction baseline and verification.	Feb/Mar 22
Establish baseline for carbon measurement for investment programme schemes.	April 22

# Carbon Strategy

£13.5m  
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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]
1. Structural Steel products in bridge beams/decks & viaducts WBS elements		x		Need calculation from NH
2. Steel Strength Standard for raw materials used in steel structures		x		Need calculation from NH
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)?	
1. Carbon Capture	Unknown at this stage and requires further research	2022	Industry support, understanding of upfront cost impact versus material cost	
2. Strength of Steel TCO – increased strength less Steel less Carbon more weight	Unknown at this stage and requires further research	2022	Baseline, NH Standards challenged trial investment programmes, cross functional working	
3. Logistics installations	Unknown at this stage and requires further research	2024/2025	Supplier community groups set up, innovation captured, HE implementing	
4. Manufacturing – modern methods of construction	Unknown at this stage and requires further research	2023/2024	Technology investment, maintenance programme review, changes embedded	

Steel features heavily in other categories such as Concrete Structures and Road Restraint Systems – opportunity to identify carbon impact of products with concrete vs steel and explore other material opportunities.

Reducing carbon is being explored through Gantry Supplier Community and centrally through the Sector Improvement Project (SIP) P3 Carbon Group lead by Tim Jordan (Balfour Beatty).



## Category Profile

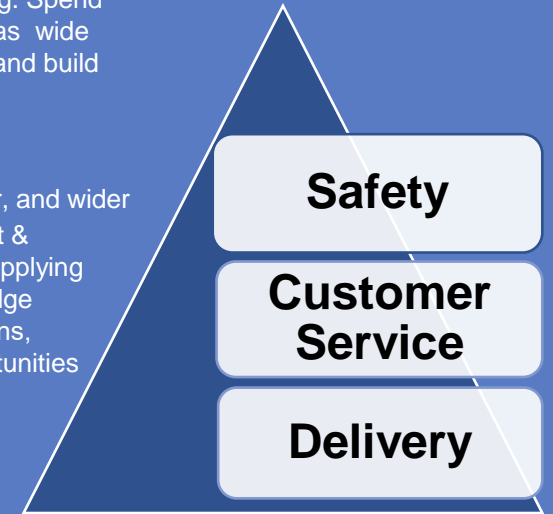
**Vision:** To identify a strategic category approach for Structural Steel that will meet the demands of all our investment programmes whilst delivering the safest and most efficient solutions. Drive efficiencies in design, procurement and production of assets to increase productivity and improve scheme delivery which will enable us to target opportunities with a 5% efficiency saving with a stretch goal of 10% of the total spend.

**Goals:** To provide an effective strategy, derived from a detailed analysis and holistic approach to risk and opportunity identification, that can be embedded across the NH business. Offer solutions on how to achieve the greatest innovations and efficiencies for the future that shape the future of the sector. Implementation of standardisation, innovation and digital product catalogue suite of components fit for purpose across the wider NH business. Direct Tier 2 engagement to have a voice for continued efficiency and continuous improvement by monitoring and enhancing KPIs.

**Scope:** Structural Steel covers a wide range of sub-categories; touching on Concrete Structures & Repairs, Corrosion Protection, piling, barriers and even fencing. Spend is derived from Major Projects and Operations and has a wide spectrum of stakeholders. Ensuring total life costing and build quality in any asset is key.

**Opportunities:** RIP (A66) as demonstrator, and wider rollout of initial construction through Digital by Default & Innovation Reapplied. Identify Operations schemes applying new techniques in repairs and rolling out via Knowledge Transfer Packs (KTP's). Develop implementation plans, measures and review to demonstrate scalable opportunities and routes for deployment and delivery.

## Business Need



### Structural Steel Strategy Executive Summary

**Landscape:** The subcategories all have elements of:

- Materials - vary in competitive and non-competitive (restrictive market) levers
- Labour - can be specialist and more traditional broader skills
- Design - not only a programme and price impact but has a through total life impact
- Installation - influenced by design, site access, programme and price
- Maintenance – Operations live with what is built so 360 analysis is vital – build with total maintenance cost in mind
- Manufacture – wide range of opportunities; lower carbon products, off-site, economies of scale
- End of life disposal – recycling and refurbishment opportunities

Categories are managed by Tier 1 Main Contractors with many sub-suppliers available to undertake the works. Efficiencies in design, right first time, site installation and maintenance are specialist markets with fewer suppliers

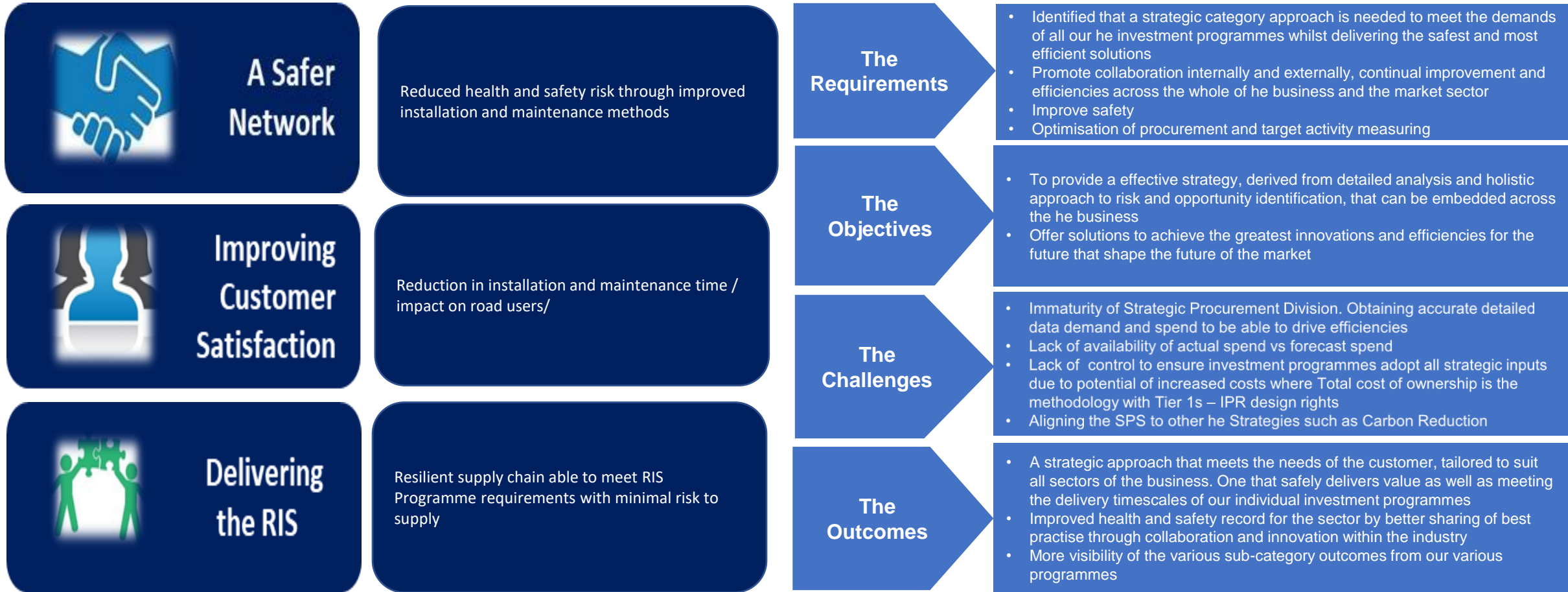
Objectives	Year 1	Year 2-3	Year 4+
Strategic Sourcing	Set vision & goals: implement strategy	Embed & deliver: strategic savings	Identify & develop: future technologies
NH rollout	Collaboration with RIP(RDP DIPs), A428 and Operations to support their related requirements	All NH investment programmes (RIP, CIP & LTC)	All parts of the business working as one with a fully optimised approach to sharing best practice
Efficiencies	Standard design and Digital Kit of Parts	Better protection of assets & building learning into future standardised designs	Standardised materials, optimised economies of scale and off-site solutions

## Market Intelligence

## Strategic Approach

# Statement of Need

A link to the Statement of Need can be found here:  
<http://share/share/lisapi.dll?func=ll&objaction=overview&objid=95312348>



**Conclusion:** Steel products feature in many other categories that will require close collaboration with other Category Leads & Managers – this strategy focuses on Structural Steel spend such as bridge beams/decks & viaducts in Commercial Services' WBS elements at level 3 & 4. Early involvement with extended supply chain (Tiers 2,3 & 4) during the design phase will assist in producing efficiencies for Net Carbon Zero targets. Opportunities for supplier community to be set up to drive innovation and trial solutions on schemes to then be rolled out across all National Highways investment programmes.



# Business Requirements and Objectives



Requirement	Low Importance	1	2	3	4	5	High Importance
<b>Assurance of supply</b>	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
<b>Quality</b>	Quality issues have minimal impact on operations and/or				x		Quality performance has a major impact on our operations and effects the total life cost of an assets. It is also important in design as anecdotal evidence suggest Retaining Walls for instance have a 50% re-design rate
<b>Regulatory, Ethical, Environmental</b>	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 will effect our customer perception
<b>Service</b>	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. This needs to be considered for major projects as well as maintenance as both impact the customer.
<b>Cost</b>	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
<b>Innovation</b>	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, operating and upgrading England's Strategic Road Network (SRN). The strategic procurement/category delivers cost and carbon reduction across all investment programmes through Innovation Reapplied. A structured management approach will enable the sector to develop new innovative materials and solutions.

NH Directorate	Specific Objectives
RIP, CIP & LTC	<ul style="list-style-type: none"> <li>Deliver sustainable, efficient solutions,</li> <li>Understand innovation opportunities and identify net zero carbon opportunities</li> <li>Translate innovation and market opportunity into design standards</li> <li>Reduce site time to improve customer satisfaction by Earlier and more integrated collaborations to ensure efficiencies are possible and are embedded through the process</li> <li>Engage and maintain Tier 1, 2 3 relationships to cultivate efficiencies</li> </ul>
Operations	<ul style="list-style-type: none"> <li>Ensure supplier performance is maximised</li> <li>Improve asset management and improvement in programming</li> <li>Commitment from supply chain to deliver solutions and net zero Carbon agenda.</li> <li>Identify Sustainable innovations in products and process.</li> <li>Ensure maintenance issues are considered in the upfront deign of new assets</li> </ul>
SMPA	<ul style="list-style-type: none"> <li>Identifying opportunities for lower carbon products, installation and reductions in product wastage</li> <li>Improve productivity/reduction of closures</li> <li>Earlier and more integrated collaborations to ensure efficiencies are possible and are embedded through the process</li> <li>Ensure designs, products and installation methods are transferable to all schemes</li> <li>Design out on-site programme logistics and consider maintenance requirements and logistics</li> <li>Engage and maintain Tier 1, 2 3 relationships to cultivate efficienciesStandardisation and right first time approach (this requirements full supply chain involvement not just Designers)</li> </ul>



# RIS 2 Historical Spend

<http://share/share/llisapi.dll?func=ll&objaction=overview&objid=97183742>

**Caveat:** the figures given here are based on HE payment directly to structural steel suppliers but much harder to capture in-direct spend paid to the sector via Tier 1 Delivery Partners - will improve through category coding in Project Bank Accounts (PBAs) and new HE Commercial platforms (PRISM and WEBCAST).



## Historical Spend RIS1

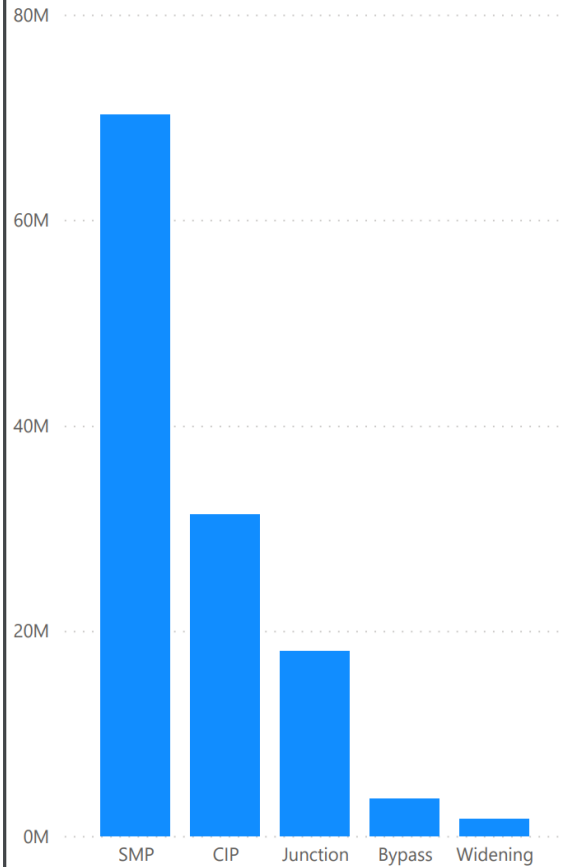
(based on Target Prices with inflation adjustment)

Category

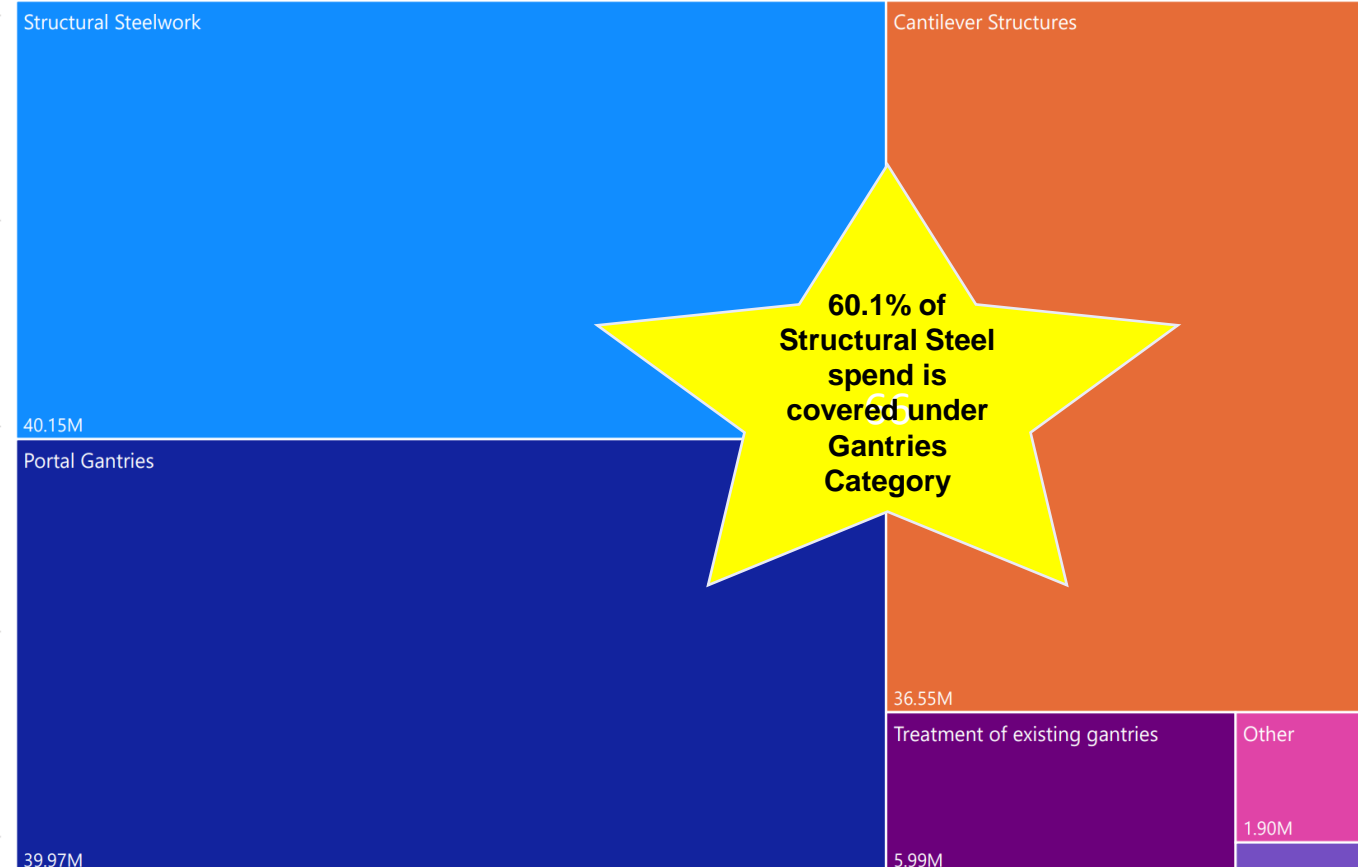
Structural Steelwork

Prices are indexed to Q2 2020

Cost by Work Type



Spend split by Components



**Conclusion:** The major element of structural steel spend is covered by Gantries (as identified in historical spend based on A14 scheme).

Structural Steel elements were only £40.5m of the spend, whereas gantries made up £82.51m of the overall total.

Gantries exist as a category in its own right, with its own Strategic Procurement Strategy (SPS) that captures a separate spend profile.

Other steel elements/products are identified and covered under a number of other categories such as Digital Services for IT Roadside Technology, Concrete Structures, Road Restraint Systems, General Civils, etc.

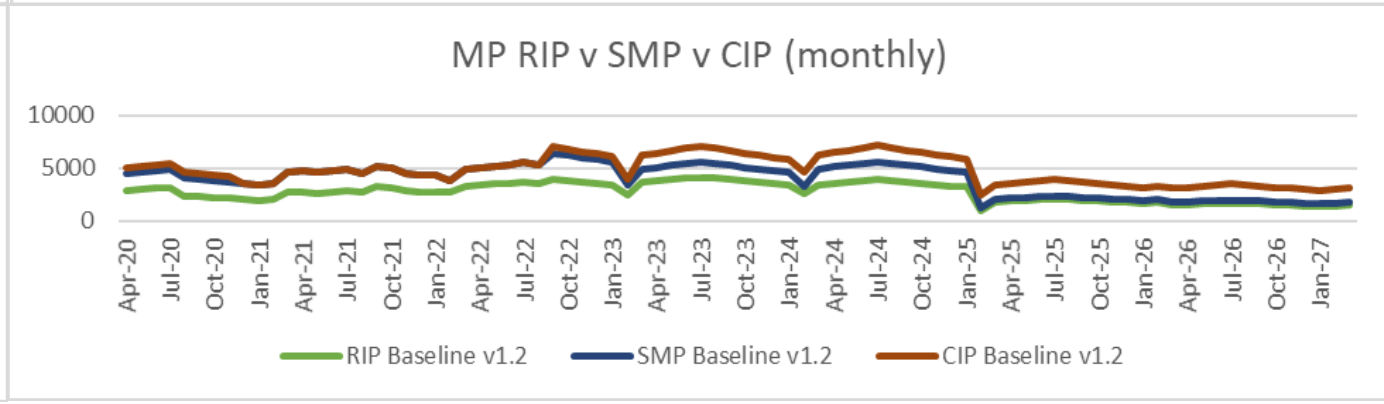
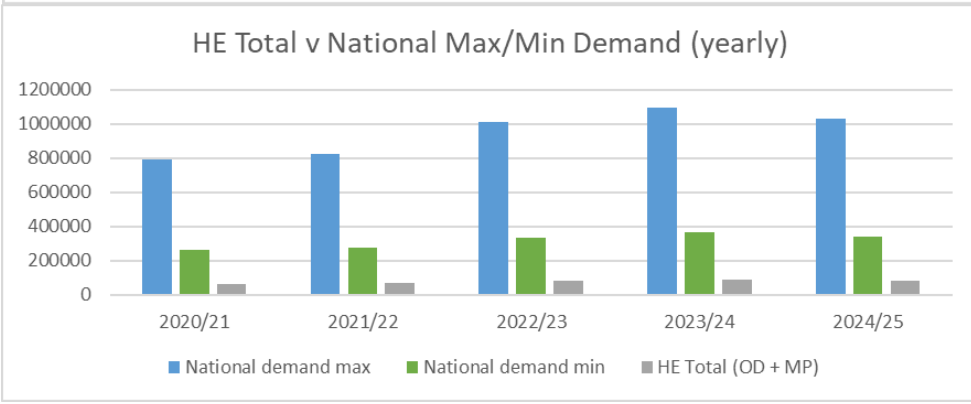
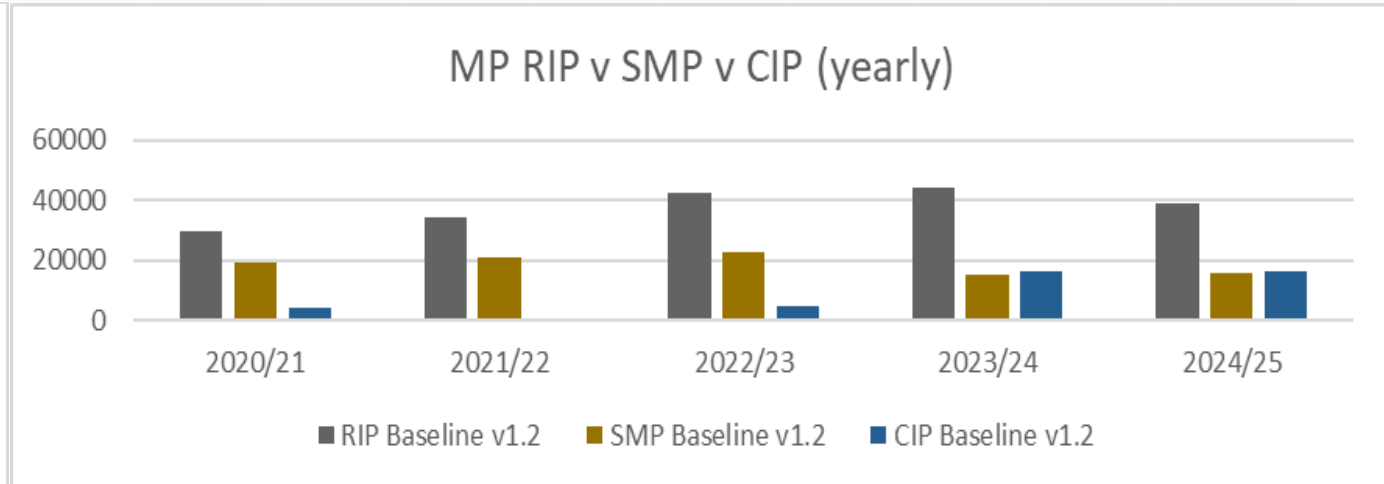
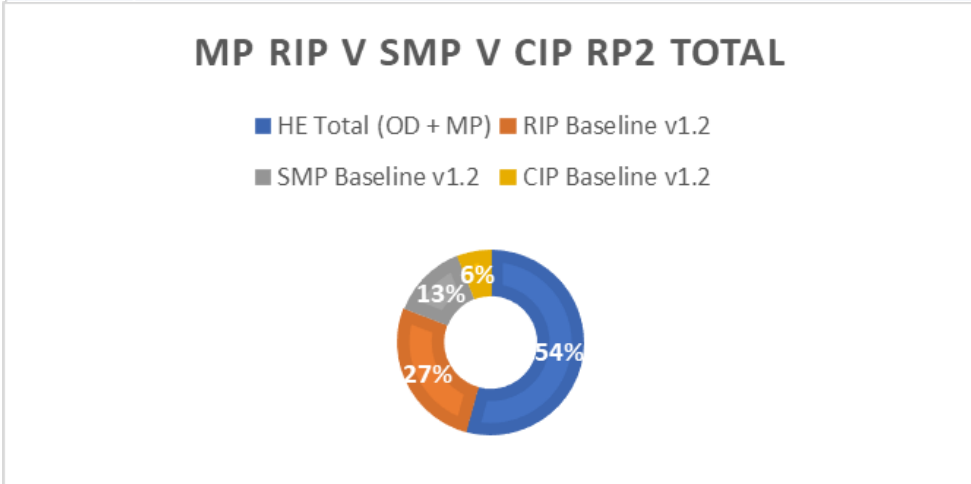


# Demand Profile – Structural Steel

**Caveat:** deeper dive analysis to be able to segregate the demand into the subcategories is required to help facilitate shaping of the market. Continued work with this will support the market and give clearer plan for the supply chain.



Steel - Tonnes		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
W46	Steel	0.00	2591	11438	15312	12616	16328	1622	4138	3766	3121	0



**Conclusion:** significant increase in requirements between 2023-25. There are currently several suppliers across the UK supplying structural steel services; a move to fewer suppliers would reduce National Highways’ breadth of supply and potentially increase capacity issues. However, the supplier base is large enough and good demand/programme profiling will mitigate any risk – so early engagement, sight of pipeline & lead-in time orders are essential.



# Future Spend – Major Projects

Major Projects Total Forecast Spend - derived at Programme Level

● Total Yr 1 ● Total Yr 2 ● Total Yr 3 ● Total Yr 4 ● Total Yr 5

**Caveat:** the figures given here are based on previous percentage spend against WBS elements from RP1 and the mid-point of RP2 assumptions. These percentages are then modelled against the current he capital budgets for our investment programmes to reach a high-level spend forecast.

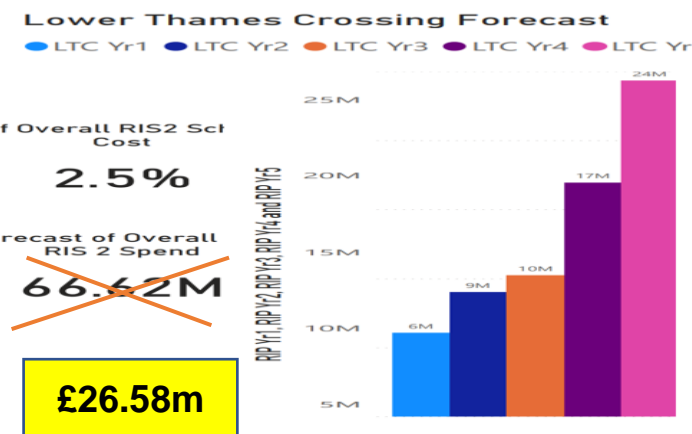
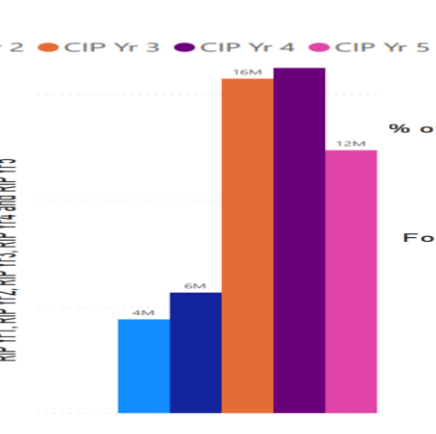
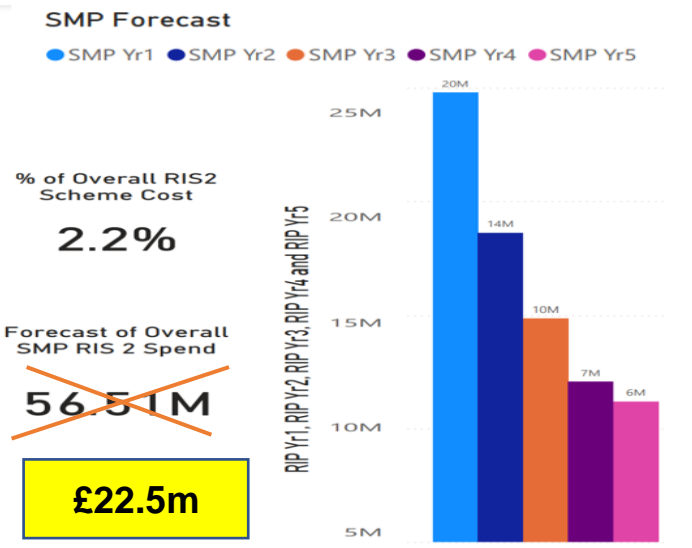
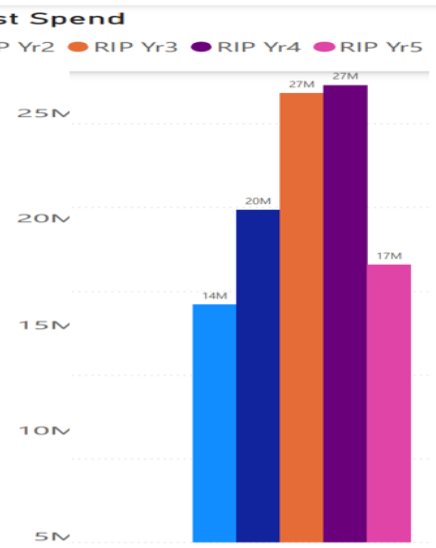
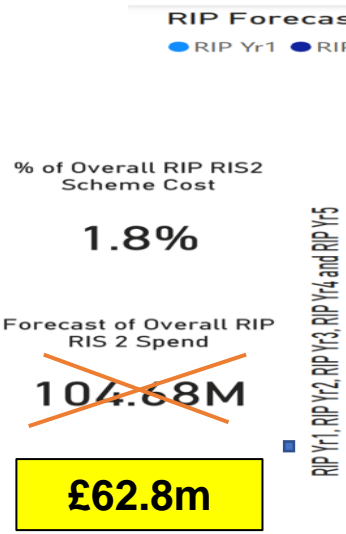
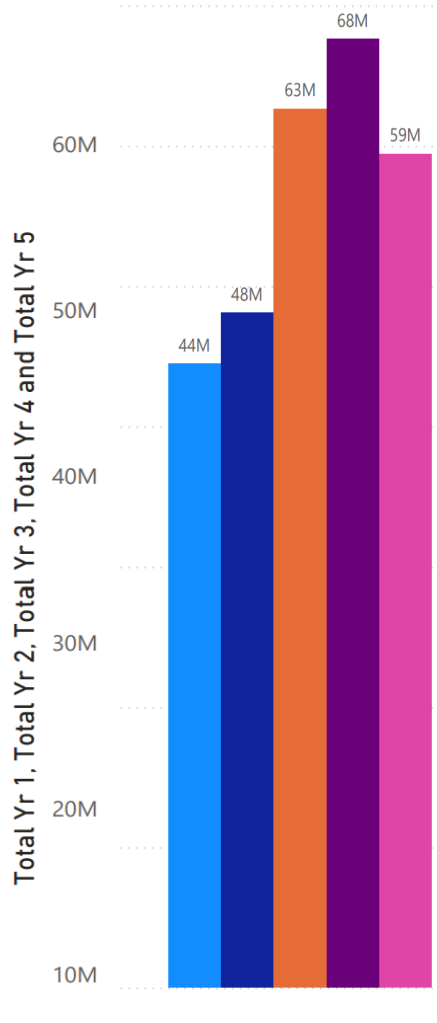
% of Overall RIS2 Scheme Cost

**2.15%**

Forecast of Overall RIS 2 Spend

~~282.2M~~

**£112.6m**



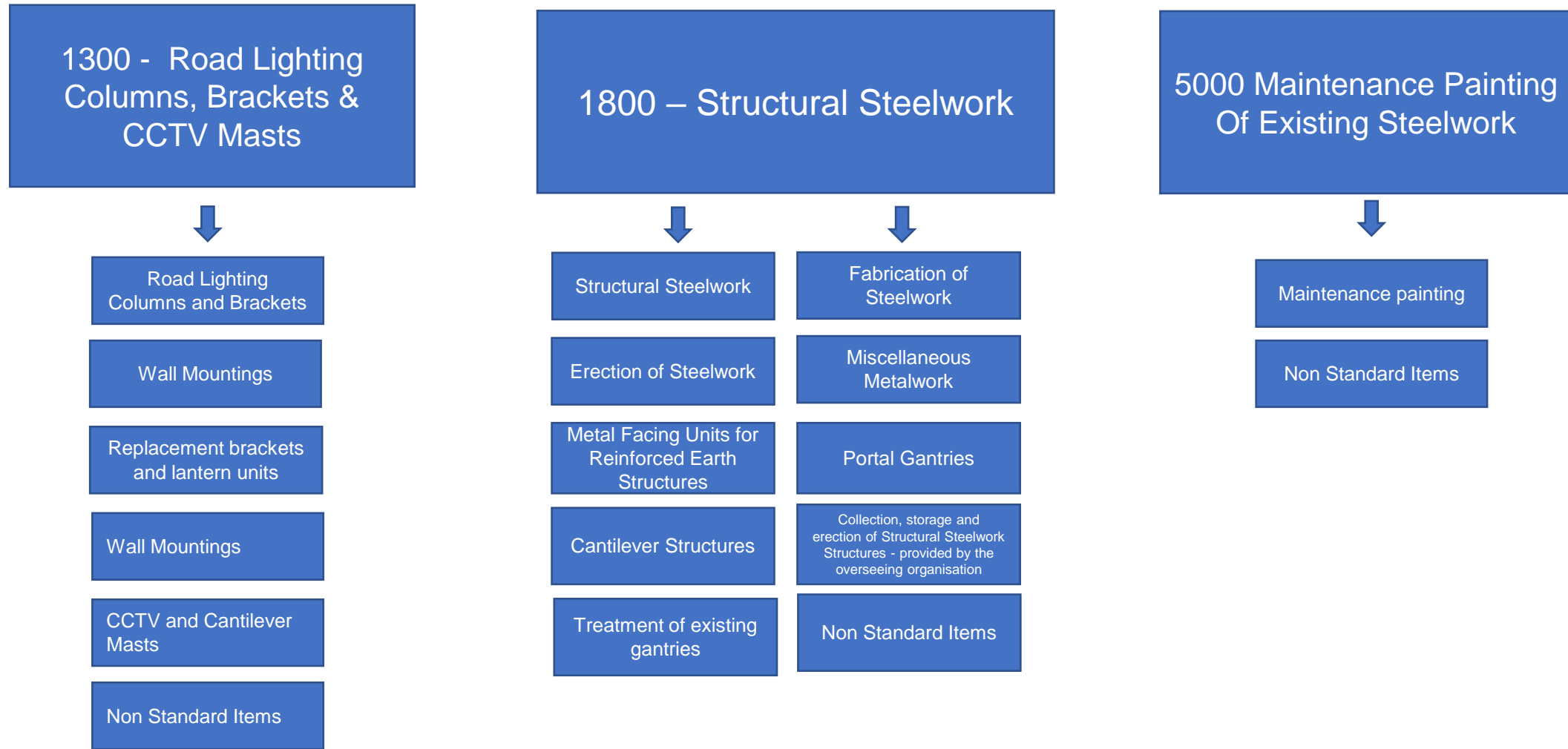
This is summary of programme level forecasts and the total above reconciles with individual programme tabs.

The Overall RIS2 Scheme Cost percentage above has been derived from the previous tabs information, whilst the "Total - forecast" tab gives high level percentage.

**Conclusion:** The original Power BI forecast included Gantries which is covered under a separate category strategy. Based on previous RIS breakdowns Structural Steel spend without Gantries totals £112.6m spread across investment programmes for bridge beams/decks & viaducts WBS elements.



# Structural Steel – Scope & WBS Elements



**Conclusion:** There are a number of steel elements/products which will be signposted to other category strategies, such as Gantries, Digital Services, Road Restraints Systems, Concrete Structures and General Civils (Groundworks). Structural Steel and Concrete Structures are the only two categories that cover multiple different elements which fall under other Category Leads to manage.

# Value Chain Analysis



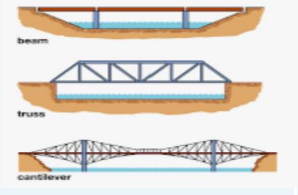

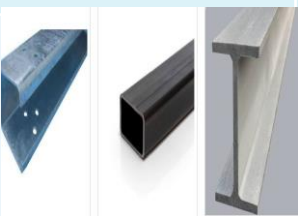
- Development of category strategies based on potential for standardisation, volume and supplier risk/capacity/capability.
  - Potential for bulk purchase of standard products & materials.
  - Understand the value of carbon – footprint, opportunities, reduction and impact.
  - Incentivise offsite construction methods where possible, to maximise safety and environmental benefits.
- Maximise the benefits of standardisation by taking an organisational view of demand and requirements rather than a project or programme view.



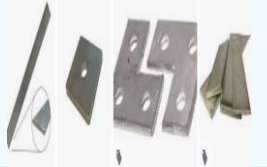


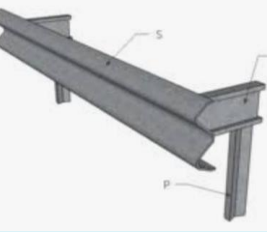

Material Production			
<ul style="list-style-type: none"> <li>• <b>Steel making 65%</b></li> <li>• <b>Manufacture 20%</b> <ul style="list-style-type: none"> <li>• <b>Storage 6%</b></li> <li>• <b>Delivery 9%</b></li> </ul> </li> </ul>	<p>For hollow sections, this would be :</p> <ul style="list-style-type: none"> <li>• Steel making coil</li> <li>• Manufacturing the structural hollow sections</li> <li>• Storage of coil and finished lengths</li> <li>• Delivery – from Port Talbot to tube mill &amp; from tube mill to customer (fabricator or distributor)</li> </ul>	<p>This does not included the installation as the material will be transported to the fabricator who then carries this out. The transported element from the steel manufacturer to the customer is covered in delivery. Efficiency - savings from bulk procurement and mass production opportunities.</p>	<p>This then allows you to use more than just structural hollow sections as the steel making remains the same for all steel products made in the UK. Efficiency - Value engineering, standardised design, used many times, avoiding repeat design.</p>

Fabrication & Manufacture	
<ul style="list-style-type: none"> <li>• <b>Raw material, 33%</b></li> <li>• <b>Manufacture, 33%</b></li> <li>• <b>Storage &amp; Delivery, 3%</b> <ul style="list-style-type: none"> <li>• <b>Installation, 16%</b></li> </ul> </li> <li>• <b>Protective treatment 15%</b></li> </ul>	<p>Storage is only generally charged on fabricated goods in the event projects are delayed. This is charged at £15/t per week, which is 0.3% of the overall cost per week. Early design engagement with Tier 1s to unlock supply chain innovation to ensure design for manufacture and fabrication.</p>





# Product Description – High Priority

Name	Description
<p>Sheet Piles</p> 	<p>Sheet piles are <b>sections of sheet steel with interlocking edges</b> that are driven into the ground to provide permanent or temporary earth retention and excavation support. Sheet piles can also be used for basements and cofferdams to provide dry working environments for construction to take place. Strong links to the General Civils Category Lead.</p>
<p>Viaducts</p> 	<p>A viaduct is a specific type of bridge that consists of a series of arches, piers or columns supporting a long elevated railway or road. Typically a viaduct connects two points of roughly equal elevation, allowing direct overpass across a wide valley, road, river, or other low-lying terrain features and obstacles – Strong link with Concrete bridges Category Lead</p>
<p>Bridge Beams</p> 	<p>Beam bridges, also known as stringer bridges, are the simplest structural forms for bridge spans supported by an abutment or pier at each end. No movements are transferred throughout the support, hence their structural type is known as simply supported.</p>
<p>Reinforcing Steel (reinforcement bar)</p> 	<p><b>Rebar</b> (short for <b>reinforcing bar</b>), known when massed as <b>reinforcing steel</b> or <b>reinforcement steel</b>,<sup>[1]</sup> is a <a href="#">steel</a> bar or mesh of steel wires used as a tension device in <a href="#">reinforced concrete</a> and reinforced <a href="#">masonry</a> structures to strengthen and aid the concrete under tension. Concrete is strong under compression, but has weak <a href="#">tensile strength</a>. Rebar significantly increases the tensile strength of the structure. Rebar's surface is often "deformed" with ribs, lugs or indentations to promote a better bond with the concrete and reduce the risk of slippage. Strong links to the Concrete Structures Category Lead.</p>
<p>Structural Steel (box girders)</p> 	<p>A <b>box girder bridge</b>, or <b>box section bridge</b>, is a <a href="#">bridge</a> in which the main <a href="#">beams</a> comprise <a href="#">girders</a> in the shape of a hollow box. The <a href="#">box girder</a> normally comprises <a href="#">prestressed concrete</a>, <a href="#">structural steel</a>, or a <a href="#">composite</a> of steel and <a href="#">reinforced concrete</a>. The box is typically <a href="#">rectangular</a> or <a href="#">trapezoidal</a> in <a href="#">cross-section</a>. Box girder bridges are commonly used for highway <a href="#">flyovers</a> and for modern elevated structures of <a href="#">light rail</a> transport. Although the box girder bridge is normally a form of <a href="#">beam bridge</a>, box girders may also be used on <a href="#">cable-stayed</a> and other bridges.</p>

# Product Description – High to Medium Priority

Name	Description	
<b>Stainless Steel</b> (incl. flat bar, fixings, panel clips & unistrut)		Encompasses a wide range of fixture and fittings made from steel (eg. brackets, bolts, Clips, fasteners, ties, hinges, etc).
<b>Steel Plate</b>		Steel Plate, or structural steel is <b>simply steel sheet material that can be customarily cut and welded to develop a more elaborate product.</b> It is made by compressing multiple steel layers together into one; forming a plate of steel. ... Applications for Steel Plate are based acutely on the specifics of the project. <b>Steel plate</b> construction is a method of rapidly constructing heavy reinforced concrete items
<b>Bridges</b>		Bridge Steel comprises of multi types of Steel bridge types, such as Truss, Beam, Arch, Road, Plate girder. Tower Sections Concrete is slightly more used but many bridges are composite – having steel beams with concrete decks – larger span bridges are generally mostly steel - Concrete is slightly more used but many bridges are composite – having steel beams with concrete decks – larger span bridges are generally mostly steel. Strong links to Concrete category Lead
<b>Steel Barriers</b>		<b>Crash barriers</b> keep <a href="#">vehicles</a> within their <a href="#">roadway</a> and prevent them from colliding with dangerous <a href="#">obstacles</a> such as boulders, sign supports, trees, bridge abutments, buildings, walls, and large <a href="#">storm drains</a> , or from traversing steep (non-recoverable) slopes or entering deep water. They are also installed within <a href="#">medians</a> of divided highways to prevent errant vehicles from entering the opposing <a href="#">carriageway</a> of traffic and help to reduce <a href="#">head-on collisions</a> . Some of these barriers, designed to be struck from either side, are called median barriers. Traffic barriers can also be used to protect vulnerable areas like school yards, <a href="#">pedestrian zones</a> , and fuel tanks from errant vehicles. Strong links to the RRS Category Lead.
<b>Lighting Columns/Masts</b>		This encompasses all types of CCTV masts to Lamp posts. High-mast lighting is a tall pole with lighting attached to the top pointing towards the ground, usually but not always used to <a href="#">light a highway</a> or recreational field. It is used at sites that require lighting over a large area. The pole that the lighting is mounted on is generally at least 30 m (98 ft) tall (under this height it is referred to as conventional lighting system), while the lighting consists of a luminaire ring surrounding the pole with one or several independent lighting fixtures mounted around it. Maintenance of these systems are done by lowering the luminaire ring from the mast head to the base using a winch and motor to the ground or at a height accessible by a <a href="#">cherry picker</a> and located in areas to allow for easier access without disrupting traffic. Strong links to the IT Category Lead.

# Product Description – Medium to Low Priority

Name	Description	
<b>Traffic Signs</b>		<p>Steel, aluminium, concrete, FRP and timber but steel tube tends to be most common for the supports, and aluminium for the actual sign plate. Along with Lighting Columns and CCTV masts a lot of the actual works activity, and therefore WBS budget will fall to the IT Category Lead it is important to link-up when considering the value and carbon savings that can be delivered through the materials used.</p>
<b>Security Fencing</b>		<p>Temporary construction works, and some noise barrier usage, as well as security fencing on some areas of road. As the actual works activity, and therefore WBS budget will fall to the General Civils Category Lead it is important to link-up when considering the value and carbon savings that can be delivered through the materials used.</p>
<b>Maintenance Painting Of Existing Steelwork</b>		<p>SES standards apply to the work which is covered by SDF Lot for Concrete Repairs. As the actual works activity, and therefore WBS budget will fall to the Concrete Structures Category Lead it is important to link-up when considering the value and carbon savings that can be delivered through the materials used.</p>
<b>Other</b>		<p>Bridge bearings are also mostly steel or elastomer. Steel is also used in parapets, handrails and other vehicle restraint systems. As the actual works activity, and therefore WBS budget will fall to the Concrete Structures and RRS Category Leads it is important to link-up when considering the value and carbon savings that can be delivered through the materials used.</p>

**Conclusion:** There are a wide range of sub categories within Structural Steel which is picked up by other categories for example concrete bridges bridge bearings, and Traffic signs, cabinets and lighting columns which are covered under digital services. Close collaboration with cross category leads.



# Supply Chain Mapping – value and objectives

Structural steel is a category of steel used for making construction materials that provides fabrication versatility and structural strength; each tier in this value chain has dependencies, but the most reliance is the provision of raw material from the tier 3 manufacturers that can be influenced by Government policy and production conditions

Some Tier 1 suppliers hold direct relation with Tier 3 suppliers for material supply and installation services



Tier 1 – Design Suppliers



- Tier 1 management businesses offer contract and **project management** services, as well as competence in managing the client's operational demands
- In addition to manufacturing, delivery and construction of steel projects, they also ensure project management, supply chain and quality assurance
- The Tier 1 companies depend on the technical expertise and production capability of their sub-contractors

- Tier 2 suppliers are mainly concerned with construction and installation services, such as bridges, hangers, warehouse and commercials
- They also provide the labour to execute the project(s)
- These players are specialists in the **Design, Build and Installation**

- These are suppliers of the structural steel required for various projects
- They provide a huge portfolio of products from **bars, hot rolled, tubes** and even coatings to further enhance steel properties
- These are massive producer and suppliers with a network all across the globe.
- Various major tier 1 and tier 2 players are their clients

- They bring together **architecture, engineering and specialisms** taking account of all clients' need, regulations and standards
- These businesses can be utilised to create standardised plans that can be used across projects to reduce variation and improve efficiency

**Conclusion:** The structural steel industry is dominated by various large players with global appeal; National Highways can contract Tier 1 companies if they wish their partner to take care of all the aspects of the project from design to construction, to quality assurance.

# Supplier Capability and Capacity – including industry accreditations



Supplier Name	Website	Key Offerings	Key Clients/Sectors Served	Projects	Regional Presence	Accreditations
<b>Severfield</b>	<a href="http://www.severfield.com/about">www.severfield.com/about</a>	<ul style="list-style-type: none"> <li>Steel Footbridges</li> <li>Beams</li> <li>Gantries</li> </ul>	<ul style="list-style-type: none"> <li>Hammerson Plc</li> <li>Railways</li> <li>Govt. Authorities</li> </ul>	<ul style="list-style-type: none"> <li>2012 Olympic Stadium</li> <li>First Direct Arena, Leeds</li> <li>The shards(London Bridge)</li> <li>National Conference Centre, Dublin, Ireland</li> <li>Ely Southern Bypass, Cambridgeshire</li> </ul>	<ul style="list-style-type: none"> <li>Manufacturing at Thirsk, Bolton, Malton, Enniskillen and Bridlington in the UK</li> <li>Bellary, Karnataka, India</li> </ul>	<ul style="list-style-type: none"> <li>ISO 27001</li> <li>ISO 14001</li> <li>OHSAS 18001</li> </ul>
<b>John Reid &amp; Sons</b>	<a href="http://www.reidsteel.com/">www.reidsteel.com/</a>	<ul style="list-style-type: none"> <li>Aircraft Hangars</li> <li>Factory Warehouse</li> <li>Industrial Buildings</li> <li>Commercial Buildings</li> <li>Steel Bridges</li> </ul>	<ul style="list-style-type: none"> <li>Belize Government</li> <li>Warehousing</li> <li>Bridges</li> </ul>	<ul style="list-style-type: none"> <li>Thruyton Hospitality Building – Hampshire</li> <li>Rizon Jet Biggin Hill Airport, Biggin Hill</li> <li>Interserve Bridge, Rotherham</li> <li>HighBay Warehouse, Hawarden</li> </ul>	<ul style="list-style-type: none"> <li>Christchurch</li> </ul>	<ul style="list-style-type: none"> <li>CE Mark</li> <li>RQSC(Register of Qualified Steelwork Contractors)</li> <li>BS EN ISO 9001:2015</li> <li>BS EN ISO 14001:2015</li> <li>BS EN ISO 45001:2018</li> </ul>
<b>J &amp; D Pierce</b>	<a href="http://www.jdpierce.co.uk/">www.jdpierce.co.uk/</a>	<ul style="list-style-type: none"> <li>Standard Structural Section</li> <li>Design and Drawing</li> <li>Shot-blasting and Painting</li> <li>Manufacturing</li> <li>Erection</li> </ul>	<ul style="list-style-type: none"> <li>Boeing</li> <li>Government Agencies</li> <li>GDF Suez</li> </ul>	<ul style="list-style-type: none"> <li>Boeing Goldcare Hangar, Gatwick Airport</li> <li>Glasgow Queen Street Station Redevelopment</li> <li>Forth Ports Grangemouth</li> <li>Dundee Railway Station</li> </ul>	<ul style="list-style-type: none"> <li>Glengarnock, Ayrshire, UK</li> </ul>	<ul style="list-style-type: none"> <li>CE BS EN 1090-1 FPC Execution Class 4</li> <li>CE BS EN 1090-2 WC Execution Class 4</li> <li>ISO 9001, ISO 14001, BS OHSAS 18001</li> </ul>
<b>Celsa Group</b>	<a href="http://www.celsagro.com/">www.celsagro.com/</a>	<ul style="list-style-type: none"> <li>Reinforcing Bar</li> <li>Yield Coil</li> <li>Wire Rod for Mesh</li> <li>Other Wire Rod</li> <li>Flat Bars Channels</li> <li>Angles</li> </ul>	<ul style="list-style-type: none"> <li>Construction</li> <li>Automotive</li> </ul>	<ul style="list-style-type: none"> <li>Crossrail, HS2,</li> <li>Hinkley Nuclear</li> <li>Heathrow Terminals</li> </ul>	<ul style="list-style-type: none"> <li>Cardiff, UK</li> <li>Spain</li> <li>Poland</li> </ul>	<ul style="list-style-type: none"> <li>AFCAB Certificate</li> <li>CELSA UK - BES 6001 Certification</li> <li>ISO 45001:2018</li> <li>ISO 14001:2015</li> <li>ISO 9001:2015</li> <li>CE marking</li> </ul>

1) NA refers to the information which is not available on the Companies House and has not been disclosed by supplier on the public domain

# Supplier Capability and Capacity – including industry accreditations



Supplier Name	Website	Key Offerings	Key Clients/Sectors Served	Projects	Regional Presence	Accreditations
<b>Walter Watson</b>	<a href="http://www.walter-watson.co.uk/">www.walter-watson.co.uk/</a>	<ul style="list-style-type: none"> <li>Structural Steel Services</li> <li>Design</li> <li>Manufacture</li> <li>Distribution</li> <li>Build</li> </ul>	<ul style="list-style-type: none"> <li>Public and Private Sector Clients in Sectors including, Health, Retail, Residential, Commercial, Industrial, Airports and Power</li> </ul>	<ul style="list-style-type: none"> <li>Mercedes Showroom, Dartmouth</li> <li>Dunblane Street, Glasgow</li> <li>Walney Airport Barrow in Furnace</li> <li>Milton Keynes Car Park</li> </ul>	<ul style="list-style-type: none"> <li>Castlewellan, County Down</li> </ul>	<ul style="list-style-type: none"> <li>BS EN ISO 45001:2018</li> <li>BCSA</li> <li>FPC - BS EN 1090-1:2009 + A1:2011</li> <li>ISO 9001:2015</li> </ul>
<b>Billington Structure Steel Works</b>	<a href="http://billington-structures.co.uk/">billington-structures.co.uk/</a>	<ul style="list-style-type: none"> <li>Design Service</li> <li>Procurement Services</li> <li>Manufacturing Services</li> <li>Installation Services</li> <li>Project Management Services</li> </ul>	<ul style="list-style-type: none"> <li>Commercial</li> <li>Education</li> <li>Industrial</li> <li>Defence</li> <li>Infrastructure</li> <li>Residential</li> <li>Energy</li> </ul>	<ul style="list-style-type: none"> <li>The Glass Works</li> <li>Earls Gate Energy Centre</li> <li>Dirft III</li> <li>Melton 2</li> </ul>	<ul style="list-style-type: none"> <li>South Yorkshire</li> <li>Steel fabrication plants in Bristol and Barnsley</li> </ul>	<ul style="list-style-type: none"> <li>RQSC for Bridgeworks</li> <li>BS EN ISO</li> <li>BS EN ISO 14001</li> <li>BS EN ISO 9001</li> <li>BS EN ISO 45001</li> <li>BS EN ISO 3834-2</li> </ul>
<b>William Hare</b>	<a href="http://www.hare.com/">www.hare.com/</a>	<ul style="list-style-type: none"> <li>Project Management</li> <li>Engineering Design</li> <li>Supply Chain</li> <li>Production</li> <li>Construction</li> </ul>	<ul style="list-style-type: none"> <li>Commercial</li> <li>Retail</li> <li>Power</li> </ul>	<ul style="list-style-type: none"> <li>20 Fenchurch St</li> <li>St James Market</li> <li>Barton Square Trafford Center</li> <li>Mall of the Emirates</li> </ul>	<ul style="list-style-type: none"> <li>Wales</li> <li>Manchester</li> <li>Scarborough</li> <li>Grantham</li> <li>Wetherby</li> <li>Derby</li> </ul>	<ul style="list-style-type: none"> <li>RoSPA</li> <li>BES 6001</li> <li>CE marking</li> <li>ISO 14064-1</li> <li>British Safety Council</li> </ul>
<b>BHC</b>	<a href="http://www.bhc.ltd.uk/">www.bhc.ltd.uk/</a>	<ul style="list-style-type: none"> <li>Design Services</li> <li>Manufacturing</li> <li>Engineering</li> <li>Installation</li> <li>Structural Steel Services</li> </ul>	<ul style="list-style-type: none"> <li>Rolls Royce</li> <li>Alexander Anderson</li> <li>INEOS Olefins &amp; Polymers</li> <li>Scania Great Britain</li> <li>Hamilton Waste &amp; Recycling</li> </ul>	<ul style="list-style-type: none"> <li>Parcelforce Warehouse, Cambuslang</li> <li>Scania Truck Depot, Grangemouth</li> <li>Romford Rail Operating Centre (ROC)</li> <li>Aircraft Maintenance Facility</li> </ul>	<ul style="list-style-type: none"> <li>South Lanarkshire, Scotland, UK</li> </ul>	<ul style="list-style-type: none"> <li>BCSA</li> <li>RQSC</li> <li>SSIP</li> <li>RISQS</li> <li>CE Class 4</li> </ul>

1) NA refers to the information which is not available on the Companies House and has not been disclosed by supplier on the public domain

# Supplier Financials

Indicator



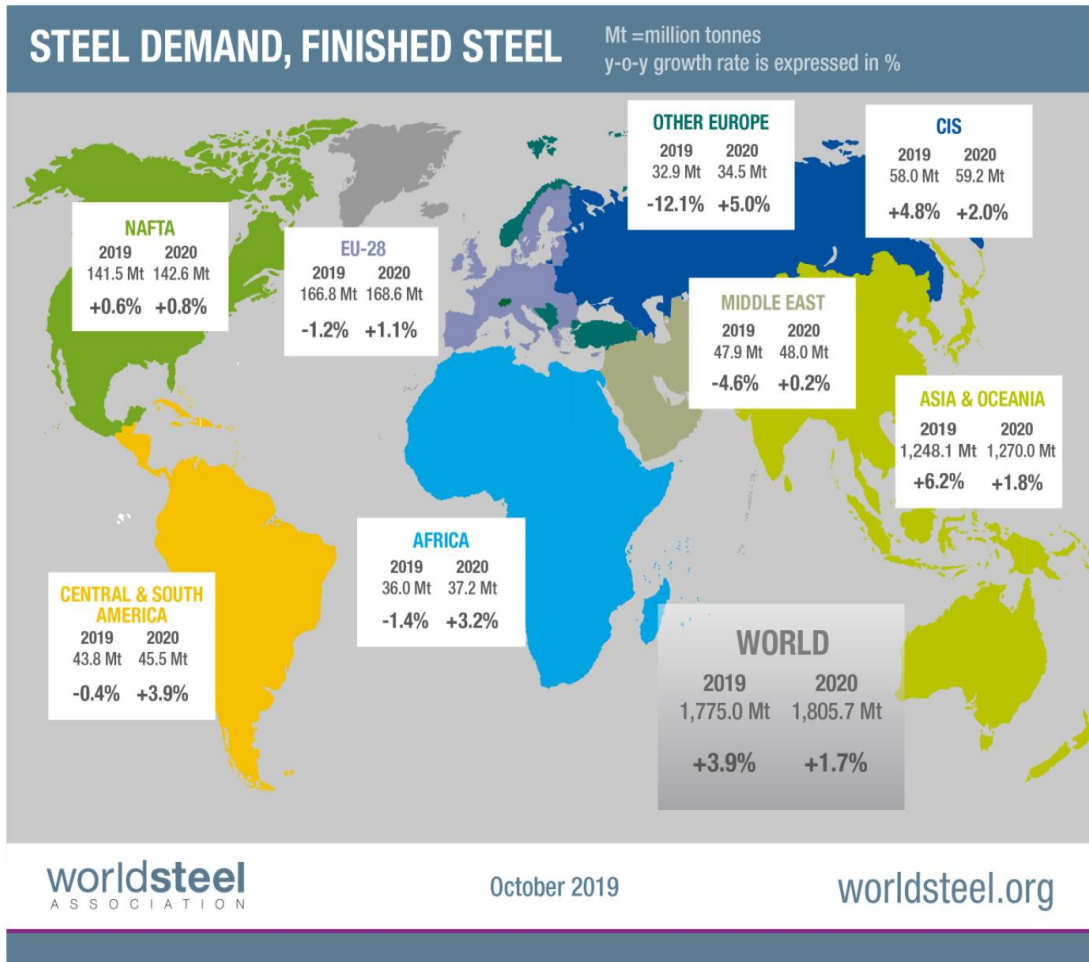
Supplier Name	Revenue (£ million)	Revenue Growth <sup>1</sup> (% , YOY)	Operating Margin <sup>1</sup> (%)	Net Margin <sup>1</sup> (%)	Net Worth (£ million)	Financial Strength <sup>2</sup>
Severfield PLC (2020)	327.4	19%	8.9%	7.2%	22.6	
REIDsteel (2020)	20.4	5.6%	1.6%	NA	2.5	
Celsa Group (2019)	432	-3.4%	1%	-1%	25.8	
BHC (2021)	65.1	-12.9%	14.5%	12.3%	40.5	
Billington structure Steel works (2020)	56.6	-46.6%	0.17%	0.35%	11.4	
TATA Steel UK (2020)	2,143	-12.3%	23%(loss)	24.5%(loss)	1,940	
William Hare (2019)	142	-15%	3%	2%	53.1	
Barrett Steel (2020)	299.2	-4.9%	0.7%	0.03%	50.4	
J & D Pierce Contracts (2020)	59.8	-11.8%	12.8%	9.9%	36.8	

1) NA refers to the information which is not available on the Companies House and has not been disclosed by supplier on the public domain

2) Financial strength has been assessed by considering various financial parameters

# Global Structural Steel Production & Demand

World crude steel production reached **1 868.8 million tonnes (Mt)** for the year 2019.



### Major steel-producing countries 2019 and 2020

million tonnes, crude steel production

Country	2020		2019	
	Rank	Tonnage	Rank	Tonnage
China	1	1 064.8	1	995.4
India	2	100.3	2	111.4
Japan	3	83.2	3	99.3
United States	4	72.7	4	87.8
Russia	5	71.6	5	71.7
South Korea	6	67.1	6	71.4
Turkey	7	35.8	8	33.7
Germany	8	35.7	7	39.6
Brazil	9	31.0	9	32.6
Iran	10	29.0	10	25.6
Taiwan, China	11	21.0	12	22.0
Ukraine	12	20.6	13	20.8
Italy	13	20.4	11	23.2
Vietnam	14	19.5	15	17.5
Mexico	15	16.8	14	18.4
France	16	11.6	16	14.4
Spain	17	11.0	17	13.6
Canada	18	11.0	18	12.9
Indonesia <sup>(a)</sup>	19	9.3	21	7.8
Egypt	20	8.2	24	7.3
Poland	21	7.9	19	9.0
Saudi Arabia	22	7.8	20	8.2
Malaysia <sup>(a)</sup>	23	7.1	26	6.8
United Kingdom	24	7.1	25	7.2
Austria	25	6.8	23	7.4
Belgium	26	6.1	22	7.8
Netherlands	27	6.1	27	6.7
Bangladesh	28	5.5	30	5.1
Australia	29	5.5	29	5.5
Czechia	30	4.5	33	4.4
Thailand	31	4.5	34	4.2
Sweden	32	4.4	31	4.7
Algeria <sup>(a)</sup>	33	4.0	43	2.4
Kazakhstan	34	3.9	35	4.1
South Africa	35	3.9	28	6.2
Pakistan	36	3.8	40	3.3
Argentina	37	3.7	32	4.6
Finland	38	3.5	37	3.5
Slovakia <sup>(a)</sup>	39	3.4	36	3.9
Romania	40	2.8	38	3.4
United Arab Emirates	41	2.7	39	3.3
Belarus	42	2.5	41	2.6
Portugal	43	2.2	45	2.0
Oman <sup>(a)</sup>	44	2.0	46	2.0
Philippines <sup>(a)</sup>	45	1.9	48	1.9
Luxembourg	46	1.9	44	2.1
Hungary	47	1.5	49	1.8
Serbia	48	1.5	47	1.9
Greece	49	1.4	50	1.4
Kuwait <sup>(a)</sup>	50	1.3	53	1.3
Others		16.2		19.2
World		1 877.5		1 874.4

### Major importers and exporters of steel 2020

million tonnes

Rank	Total exports	Mt
1	China	51.4
2	Russia	31.5
3	Japan	29.8
4	South Korea	27.6
5	European Union (28) <sup>(1)</sup>	22.6
6	Germany <sup>(2)</sup>	21.2
7	Turkey	18.5
8	India	17.1
9	Ukraine	15.2
10	Italy <sup>(2)</sup>	14.9
11	Belgium <sup>(2)</sup>	12.9
12	Brazil	10.6
13	France <sup>(2)</sup>	10.2
14	Taiwan, China	10.0
15	Malaysia	8.4
16	Netherlands <sup>(2)</sup>	8.3
17	Spain <sup>(2)</sup>	7.9
18	Vietnam	7.8
19	Canada	6.9
20	United States	6.3

Rank	Total imports	Mt
1	China	37.9
2	European Union (28) <sup>(1)</sup>	32.6
3	United States	19.9
4	Germany <sup>(2)</sup>	18.2
5	Italy <sup>(2)</sup>	15.5
6	Vietnam	13.7
7	Thailand	13.1
8	Turkey	12.5
9	France <sup>(2)</sup>	11.8
10	South Korea	11.5
11	Poland <sup>(2)</sup>	10.8
12	Belgium <sup>(2)</sup>	10.4
13	Mexico	9.7
14	Indonesia	9.3
15	Spain <sup>(2)</sup>	8.7
16	Netherlands <sup>(2)</sup>	7.8
17	Taiwan, China	7.3
18	Saudi Arabia	7.0
19	Canada	6.8
20	Philippines	6.6

**Conclusion:** China produces the most Steel globally by a large margin, at an estimated 1064.8 million metric tons in 2020, followed by India at 100.3 million metric tons in the same year. China currently exports over half of the Global export market. Chinese steel demand is expected to grow by 1.0%, whereas steel demand in the rest of the world will grow by 2.5%, driven by 4.1% growth in the emerging and developing economies excluding China. Global steel demand grew by 3.9% to 1,775.0 Mt in 2019 and another 1.7% in 2020, reaching 1,805.7 Mt.

# Global Structural Steel Production & Demand

Apparent steel use (consumption) per capita 2020 (kilograms)



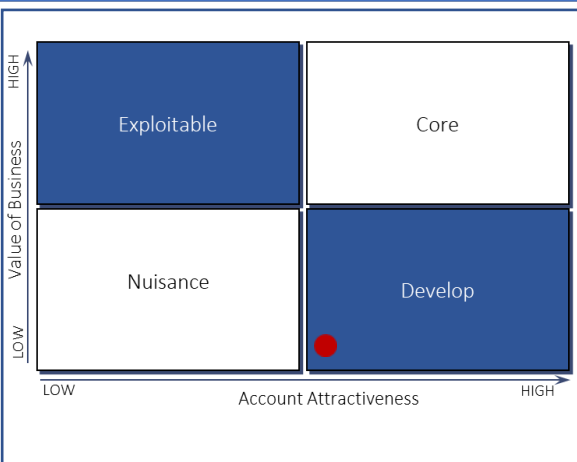
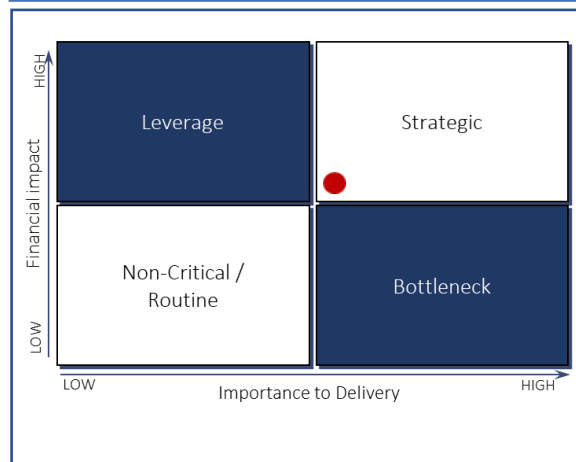
**Conclusion:** UK is one of the smaller consumers in the global playing field. Steel production in the United Kingdom is expected to be 850.00 thousand tonnes by the end of this quarter, according to Trading Economics global macro models and analysts expectations. Looking forward, we estimate steel production in the United Kingdom to stand at 800.00 in 12 months time. In the long-term, the United Kingdom steel production is projected to trend around 850.00 thousand tonnes in 2022, according to our econometric models.

# Supplier Analysis



STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> <li>National Highways is an established company and a government body so it benefits from a strong credibility and trust from investors.</li> <li>National Highways has a strong competitive advantage with its knowledge, economies of scale and past contracts with main players in the industry.</li> <li>Trained personnel and specialised workforce in the UK.</li> </ul>	<ul style="list-style-type: none"> <li>Slowness of internal development and approvals makes innovation implementation a very long process.</li> <li>Overlaps between some area of the business which makes it difficult to have a single point of view and makes the decision process more complicated.</li> <li>Standardisation of Retaining Solutions will only extend so far into the as there are site access constraints that can dictate the type of structure available.</li> <li>National Highways requirements are mandatory and binding so can be a barrier to entry for potential suppliers; especially small companies. However, we cannot tolerate any failure on competence and skill required to fabricate so reducing would require careful consideration.</li> <li>Demand planning not in great shape – confidence needs to be gained in the supply chain over our data.</li> </ul>	<ul style="list-style-type: none"> <li>Incentivise innovations to drive industry H&amp;S improvement.</li> <li>Collaborative way of working and portion the work.</li> <li>Emphasise long term value considering whole life cost and total cost of ownership.</li> <li>Political willingness to improve safety on the roads; that implies using more innovations and technology.</li> <li>Aggregated Structural Steel requirements over several Structural Steel products could bring economies of scale</li> <li>Standardisation could bring reduced components, lower carbon, aggregated material spend, productivity improvements, safety improvements</li> <li>Use of the Digital Product Catalogue will reduce design costs</li> <li>Reduction in re-design and programme impact</li> </ul>	<ul style="list-style-type: none"> <li>Influence /impact of DfT or central government decisions on programme or funding</li> <li>Procurement/Competition law</li> <li>Brexit impact: loss of funding and potentially loss of workforce</li> <li>Supply chain maturity/appetite for change in culture</li> <li>Industry restrained capacity</li> <li>Competition from other sectors</li> <li>Reduced transparency of cost and loss of value without a commercial frameworks</li> <li>Customers might not be ready yet for some innovations</li> <li>Supply chain not ready or able to change</li> <li>NH not ready or wanting to change</li> <li>Suspicion from the supply chain over “cost cutting” rather than focus on value</li> </ul>

Political	Economic	Social-Cultural
<ul style="list-style-type: none"> <li>Growing influence of lobbies and rise in political involvement in major infrastructure</li> <li>Roads Investment Strategy (RIS): defined objectives and efficiencies to be reached</li> <li>Strong role and influence of Government Departments &amp; Agencies (Office of Rail and Road (ORR), Department for Transport (DfT), Crown Commercial Services (CCS))</li> <li>Effect of pandemic on supply chain and future investment in the roads infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Impact of GDP / Economic Growth</li> <li>Roads Investment strategy</li> <li>Stability of the Currency (£)</li> <li>Resource use efficiency (planning to maximise cost efficiency)</li> <li>Cost pressures (supply and demand led)</li> <li>Industry cost factors (pensions, oil, equipment materials)</li> <li>The highways industry is moving fast both in terms of regulation and innovation thus there is a need to adapt to stay a relevant player on the market</li> </ul>	<ul style="list-style-type: none"> <li>Mistrust of change</li> <li>High customers expectations</li> <li>Innovation driven environment</li> <li>Work of Universities and Academics on infrastructure – Increasing interest for this industry</li> <li>Better Road Safety awareness – National Highways ad campaign</li> <li>Specific trainings on technology usage</li> </ul>
Technological	Legal	Environmental
<ul style="list-style-type: none"> <li>Obsolescence of Technology</li> <li>Fast pace market</li> <li>Connectivity and wireless network are key elements for the development of future Smart Motorways</li> <li>New innovative technologies (Stopped Vehicle Detection)</li> </ul>	<ul style="list-style-type: none"> <li>health and Safety requirements</li> <li>Post Brexit Procurement rules and Competition law</li> <li>National Highways policy, IAN's on fatigue and working regulations</li> <li>Environmental protection standards and law</li> <li>Highways industry is moving fast in terms of regulation</li> </ul>	<ul style="list-style-type: none"> <li>Growing consideration of “new” pollution (noise pollution for instance)</li> <li>Sustainable solutions considered in every sector of the business</li> <li>Influence of the public on environmental key topics</li> </ul>



**Conclusion:**

There is an appetite and opportunity to develop and make the market in collaboration with the supply chain. Currently there are a couple of strategic suppliers that supply into NH.

There are greater opportunities for NH to work with the Supply Chain to change the shape of the market place and increase efficiencies, including the introduction of new entrants to produce a wider strategic supply chain.

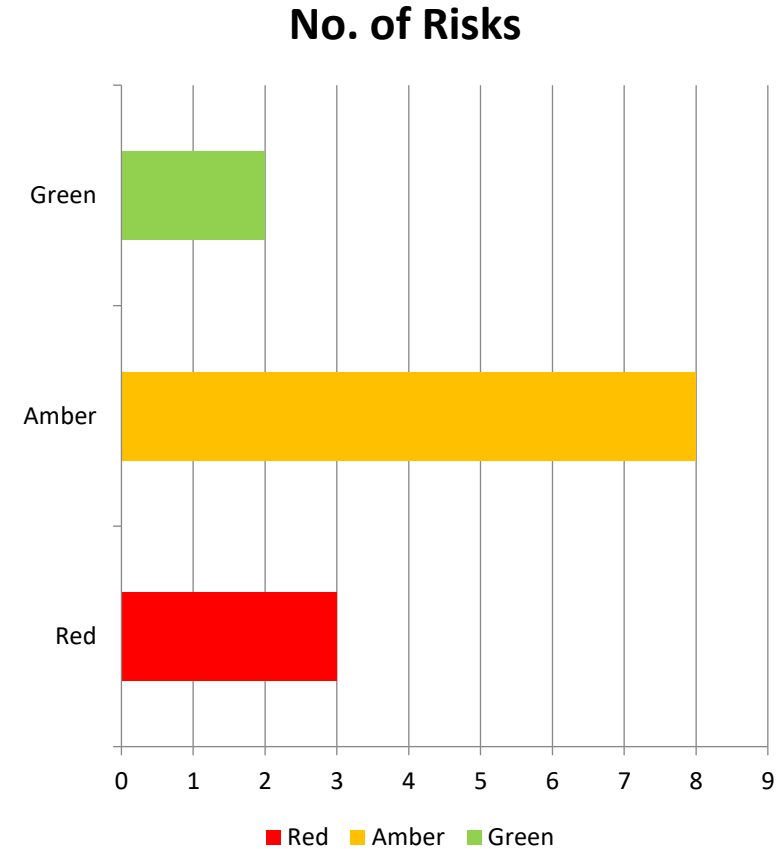


# Category Risk

Link to the Risk Register can be found here: <http://share/share/llisapi.dll/properties/90120773>



5			• Demand Data		
4		• Incomplete Cost Data	• Opportunity validation • Solution delivery	• Market factors	• Solution delivery
3		• Tier 1 Engagement • Resource	• Monitor & Measure • Carbon Reduction programme • Opportunity saturation	• Innovation rejection	
2					• Tier 2 Engagement
1					
	1	2	3	4	5



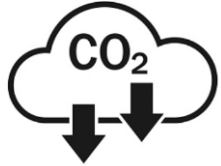
**Conclusion:**

- Ability to obtain granular data has an impact on successful category management.
- Opportunity saturation & duplication is a concern - a lot of idea generation but risk delivering none or focus on a few.
- Buy in - stakeholder engagement, buy-in and ambassadorship of delivering opportunities.
- Market factors - upturn in construction is fueling demand and outstripping supply.
- Labour and material constraints may play a factor with so many large scale projects happening at once (within NH and external (HS2), housing growth initiatives).





# Opportunities



Net Zero



Demand Planning



Shaping the Market



Innovation



Supply Chain Performance



Standardisation

**Reducing carbon needs to be considered across all sub-categories:**

- Less components and material needed
- Alternative lower carbon products
- Better demand and aggregated to utilise more energy efficient manufacturing practices
- Off-site pre cast versus logistics off site
- Recycling material
- Fabrication /design to reduce complicated designs

**Explore current demand predictions, working with the supply chain to understand in greater depth NH requirements to develop a more robust demand for RP2:**

- Develop market opportunities
- Aggregated material purchases
- Highlight NH demand versus market constraints to mitigate shortages / price increases

**Early collaboration with supply chain with designers and SES to optimise solutions for structural steel:**

- Explore new technologies, materials and standards.
- Ensure Total cost of ownership from cradle to grave to support solutions to produce savings and value add efficiencies
- Working groups through supplier community engagement.

**Drive innovation through the supplier community groups, SDF performance and Implementation Groups:**

- Facilitate workshops and support trial innovations
- Best practice and innovative endeavours to support wider endorsement and embedding innovations to become standard practice
- Drive efficiencies through cross collaborations groups in the supply chain but also cross category
- Thermax Powered Steel

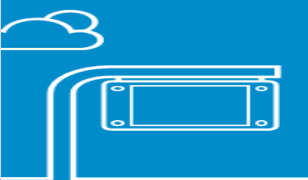
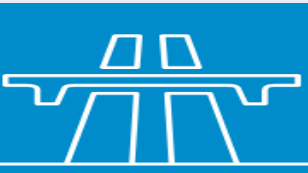

**Improve delivery and reduce safety incidents across National Highways network:**

- Improve quality to improve customer satisfaction
- KPI measurements to improve delivery and efficiencies and incentivisation
- Shape the market to increase productivity and innovation
- Collaborative approach to delivery

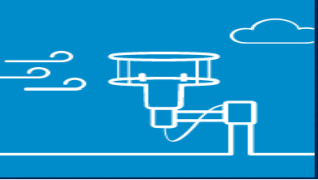


**Optimise standard solutions through cross functional collaboration with SES, Supply Chain and Designers:**

- Support with internal stakeholders to ensure wider National Highways requirements
- Needs shared through Innovation Reapplied and the Digital Products Catalogue (DPC)
- Steel Grades

# Recommendations and Summary of Savings

Structural Steel	Description	Benefit	Action
<p><b>SS01: Gantries</b></p> 	<p>Gantries equates to 60.1% of Structural Steel spend total. Portal, Cantilever and Superspans to hold range of signs, signals. Initial implementation work through the SMPA.</p> <p>.Over 60% of spend captured under Gantries SPS, emotive and highly visible product therefore treated as a separate category</p>	<p>Standardisation through DPC and Innovation Reapplied will be the key focus: cost reduction, time efficiencies and carbon reduction. DFM reduction in manufacture process. Customer satisfaction with reduction in road closure time. Carbon efficiencies</p>	<p>Updates from the Gantry implementation Group for productivity and implementation.</p> <p>Support standardisation through innovation reapplied and the DPC and REM. Strong links to production of low carbon steel.</p>
<p><b>SS02: Bridge Beams/Decks &amp; Viaducts</b></p> 	<p>Largest portion of direct spend for the category on bridge beams and decks - can be made of either steel or concrete so further investigations into the carbon footprint vs total cost of ownership needed and challenge to standards if required</p>	<p>Support CIP with procurement of A428 subcontractor – early engagement with supply chain at design stage.</p> <p><b>4% Early Supplier Engagement (£4.5m)</b></p> <p><b>3% Design for Manufacture (£3.4m)</b></p>	<p>Set up Supplier Community</p> <p>Develop opportunities within the community to capture efficiencies and innovations, share demand data to maximise opportunities:</p> <ul style="list-style-type: none"> <li>• Demand &amp; Operational Planning</li> <li>• Early Engagement &amp; Design</li> <li>• Market Opportunities &amp; Logistics</li> </ul>
<p><b>SS03: Carbon</b></p> 	<p>Support business areas in addressing our carbon reduction targets. Support other category leads on their steel elements/products with carbon offset and innovation capture. Work with Sector Improvement Project and supplier community to develop solutions, including Modern Methods of Construction and sustainable sourcing</p>	<p>Support and meet the NH target wide Net Carbon Zero plan by 2040 for manufacture and production</p> <p><b>5% Carbon Reduction &amp; Logistics (£5.6m)</b></p>	<p>Engage and represent Steel Sector (Supplier Community) at Sector Improvement Project (SIP) P3 Carbon. Group. Measure and increase carbon reduction using Carbon Measurement Toolkit.</p>

# Recommendations and Summary of Savings

Structural Steel	Description	Benefit	Action
<p><b>SS04: Columns, Masts &amp; Cabinets</b></p> 	<p>Lighting columns, CCTV masts and cabinets. To display and secure CCTV, signs and signals over the road network. Supply chain is aligned to the providers of IT Roadside Technology.</p>	<p>Link with Digital Services Procured through IT Roadside Technology includes signs &amp; signals, CCTV masts and lighting columns – support material innovations &amp; raw material aggregation.</p>	<p>Provide support/expertise on steel production and fabrication, and carbon reduction. Updates from Digital Services Cat Lead for productivity and capture steel pricing. Support standardisation through innovation reapplied and the DPC and REM.</p>
<p><b>SS05: Concrete Structures Steel</b></p> 	<p>Piling and retaining walls – rebar is used to strengthen and secure concrete structures - Along with piling this spend is covered mainly under the concrete structures asset base which is how our category is split.</p>	<p>Link with Concrete Structures Steel sheet piling and retaining walls (rebar in concrete structures) spend covered under this category. Support Cat Lead with through Steel Supplier Community</p>	<p>Provide support/expertise on steel production and fabrication, and carbon reduction. Collaborate closely with Cat Lead to understand steel usage and carbon baselines within concrete structures.</p>
<p><b>SS06: Steel Barrier</b></p> 	<p>Road Barrier – steel used for Barrier is almost an equal split 50/50 steel and concrete. Carbon impact baseline needed to understand opportunities</p>	<p>Link with Road Restraints Material intelligence and innovation opportunities supported by implementation group and Sector Improvement Project P3 Carbon. Support Cat Lead with through Steel Supplier Community.</p>	<p>Provide support/expertise on steel production and fabrication, and carbon reduction. Support the sector with demand information for material and innovation.</p>

# High-level Implementation Plan

Opportunities	2021	2022	2023	2024	2025	2026
<b>SS01: Gantries</b>		GIG Workstreams	Cost reduction identified and implemented across RDP & LTC			
			Delivery			
<b>SS02: Bridge Decks/Viaducts</b>		Demand planning & tender opportunities on A428 & A66	Design opportunities			
		Structural Steel Community		Delivery		
<b>SS03: Carbon Reduction</b>		Sector Improvement Project (SIP) P3 Carbon Group				
			Aggregated spend, off-site manufacture, alternative products, innovations, etc.			
<b>SS04/5/6 – Concrete Structures, RRS Columns/Masts &amp; Cabinets</b>		Collate steel demand and consumption across other categories				
			Support category leads with steel intelligence, innovations & carbon reduction			

**Please note: this is a very high level implementation plan.**  
Carbon Reduction opportunities are already being researched and the Sector Improvement Project (SIP) P3 group on Carbon Reduction will act as the catalyst for discussions, process for change, collaborative trials, etc. Category Leads within Digital Services & Structures will be integral to the delivery of carbon net zero within steel sector. Timescales and milestones will be finalised with the Implementation Group in partnership with the Supplier Community.