high speed one

HS1 STRATEGIC ASSET MANAGEMENT PLAN (SAMP)

HS1-AMS-201
April 2024

Foreword

The HS1 Strategic Asset Management Plan (SAMP) sets out the HS1 Asset Management Objectives giving them strategic context and describing the methodologies to be followed. This SAMP brings together a single strategy for all HS1 regulated assets, reinforcing a consistent approach to asset management across the business.

The key drivers that are currently steering our business and shaping our asset management decisions are to deliver the core (safety, asset and PR24), driving modal shift (borders, domestic and sustainability) and growth in both international and domestic train paths.

This SAMP sets out four different passenger demand scenarios. These were developed following the pandemic to support stakeholders in documenting and evaluating a broad range of asset management options. We have seen strong recovery in train paths and volumes continue to grow on a trajectory similar to the Re-build scenario as documented in the 5YAMS submission.

This SAMP will help HS1 and our strategic partners to continue to deliver excellent operational performance and prioritise investment consistently, improving cost efficiency and reducing costs for train operators.

We hope that this document is useful for all readers and we really do welcome your feedback.

Robert Sinclair
Chief Executive Officer

Contents

1 Purpose and scope

1.1 Introduction

What is HS1 if it isn't the physical infrastructure – our magnificent stations used by millions of people every year, with passengers travelling along the fastest railway in the UK, through tunnels under London and the Thames, over the award winning Medway Viaduct, all powered by environmentally friendly electricity.

How we look after our assets is fundamental to our business. Beyond our legal duty to operate, maintain and renew our assets, we have an important role contributing to the overall success of the UK plc. Many thousands of jobs in Kent and London rely on us providing reliable and economical infrastructure.

> Our long term thinking supports public and business confidence in London and the South East. And our infrastructure is not only one of the most convenient connections to the continent of Europe, it's also the most environmentally sustainable.

Our asset management strategy sets out the methodologies that we, and our strategic partners, will follow to deliver our strategic objectives. Ultimately, this is about coordinating all our processes and activities to continue to deliver a world leading high speed rail experience: to be the sustainable transport system connecting London, Kent and Europe.

As part of our responsibility for the stewardship of the railway we, at HS1, provide strategic leadership as an intelligent client. We actively listen to our customers who are vital for the viability of our business. And we work closely with our strategic partners who we depend on to make sure the railway is available for use every single day. Put simply, for us to be successful, both our customers and our strategic partners must be successful.

In this light, we are sharing this strategic asset management plan widely, with transparency and openness. We want to not only set out what we will do, and our expectations for our strategic partners, we also want to invite our customers, regulators and wider stakeholders to engage with us, to help us improve and refine our approach as we continue on our asset management journey together.

The current scope of this strategic asset management plan is limited to HS1 regulated assets, and excludes non-regulated assets such as offices, car parks and retail. Further detail on the scope of the asset management system is included in Appendix 5.

The first sections of this document set out some strategic context which frames our overall approach. We are keen to hear feedback from all stakeholders on these sections (Sections 1 and 2).

Section 3 describes our asset management objectives – the outcomes to be achieved through the operation, maintenance, and renewal of the infrastructure. This section is important as it sets out what it is we are trying to do. We would especially appreciate feedback from our customers and regulators in this section.

Section 4 sets out our expectations of our strategic partners and how we want to align our organisations around delivering the asset management objectives. This will also show how we make decisions and set out the expectations for our partners which will enable those decisions to be made. A huge part of this is about how we will put forward a credible plan for the next regulatory control period (CP4) and also sets the direction for the 10 years thereafter.

The appendices provide more extensive detail and context supporting the strategic asset management plan. These sections are intended to be useful for specific aspects of our overall approach to asset management, and while everyone is most welcome to do so, we do not expect all stakeholders to read the appendices.

1.2 Strategic partners and stakeholders

With over a decade of experience working with our strategic partners, we are grateful to have ongoing support and positive working relationships aligned around the delivery of our purpose: to be the sustainable transport system connecting London, Kent and Europe. Working with our strategic partners we act as both a supplier and a client.

Our customers provide domestic passenger services and international passenger and freight services between the UK and Europe. Our strategic partners are essential in supporting us to operate, maintain and renew the infrastructure our customers rely on.

We are regulated, with the primary obligations set out in our concession from the UK government to operate, maintain, renew and replace the HS1 assets until 31 December 2040.

Our shareholders are a consortium comprising funds, with a proven track record of owning and managing UK infrastructure businesses, advised and managed by InfraRed Capital Partners Limited and Equitix Investment Management Limited.

The following figure sets out our interactions with our stakeholders. Further details can be found in Appendix A1.2.

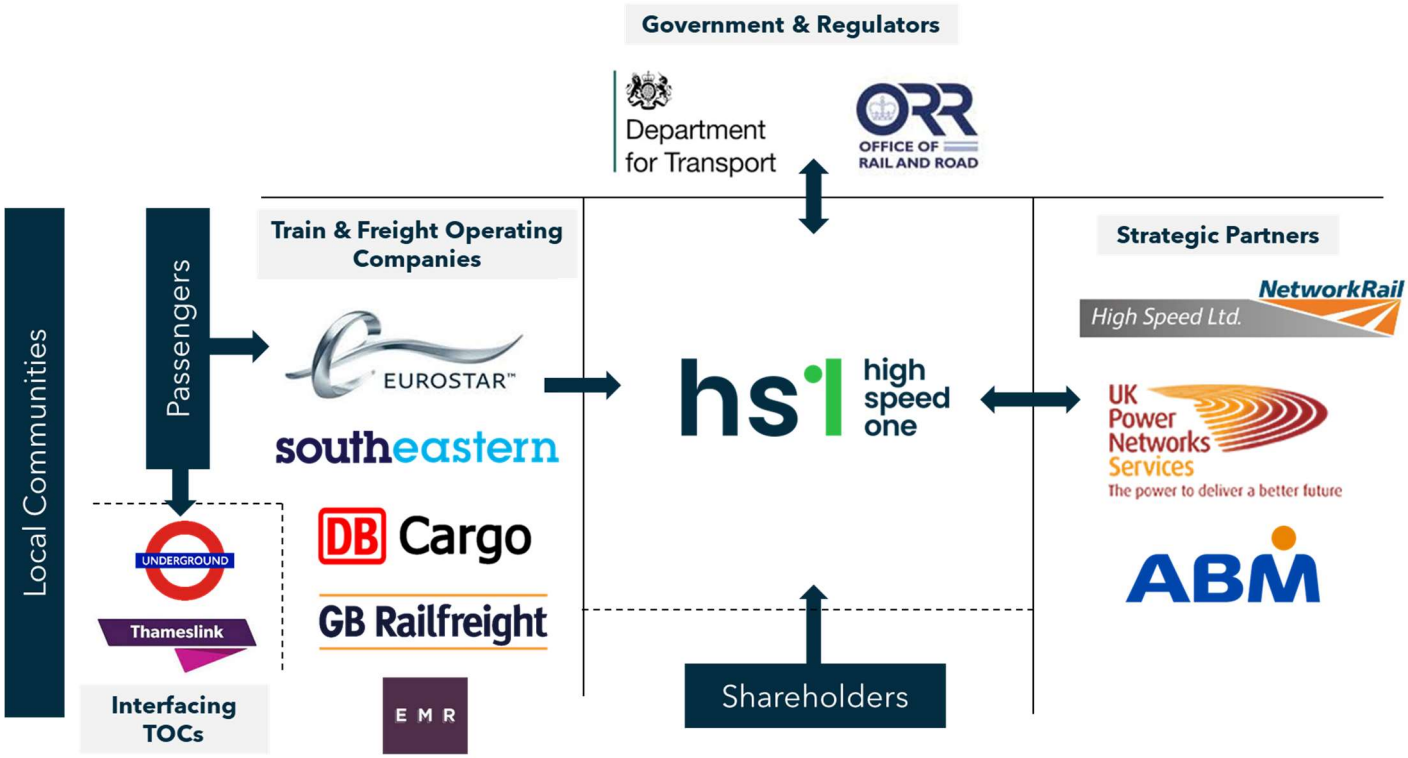


Figure 1: Stakeholder interaction map

2 The future of our assets

2.1 Strategic drivers for HS1 asset management

Our core business is about ensuring that the HS1 infrastructure is available for our customers when they need it. As set out in the HS1 concession agreement, our primary revenue stream is the sale of train paths. Our drivers are aligned with our strategic partners and their successes are to our benefit. Our asset management strategic drivers are listed below:

- **Deliver the core**: includes delivery of high quality asset performance, continued delivery of safety improvements, using our asset strategy and knowledge to further enhance renewals and operations, and successful delivery of the planned work to ensure HS1 continues to be a high-quality asset steward.
- **Driving modal shift**: pushing for sustainability modal shift and working with stakeholders to find a border solution.
- **Growth**: developing international markets, supporting the recovery of domestic train paths, station capacity, and exploring how to provide a catalyst for growth.

Our asset management approach is ultimately about sustainably delivering service to our customers, with long term reliability and performance. Everything we do is centred on maximising the value of our assets, and optimising our costs.

> Safety remains at the heart of what we do. We are proud of our safety record, and always strive to improve safety for our people, our strategic partners, and the general public who interact with our assets.

We still believe in the value of providing an environmentally friendly and sustainable connection for London, Kent and Europe. The value is not just social - but also serves part of the unique proposition to passengers that will encourage a return to growth.

The performance demands from the system will continue to be high, with continued expectations for consistently reliable world class performance, and resilience improvements to be maintained.

Likewise, the terms of our concession agreement have not changed, and we are obligated to consider the long term stewardship of the assets in terms of condition and performance, through the whole of our concession and for the whole life of the assets.

All of this together represents a need to improve our baseline asset management capability over time, keeping pace with industry good practice.

We are driven to maximise the value of our assets, where value is framed by the concession agreement. Working with our strategic partners, we are also driven to reduce the costs of the assets, both in the short and long term, where costs are regulated through the periodic review process.

To be clear – we completely understand that cost must be optimised to support the growth in demand. This is essential for our customers as it is essential for our own business needs. It is absolutely critical therefore, that future interventions – everything we do to look after the infrastructure – need to be carefully considered in terms of timing, delivery methodology, and cost impact.

Further context for our strategic drivers is provided in appendix section 2.

2.2 Reference future states

The COVID 19 pandemic had a severe impact on the HS1 system. The various travel restrictions and lockdowns significantly reduced passenger demand to travel during 2020 and 2021.

In order to meet the timelines for the CP4 5YAMS submission, we needed to develop a SAMP in 2022 to support the development of the Specific Asset Strategies. At this time there remained ongoing uncertainty around passenger demand recovery.

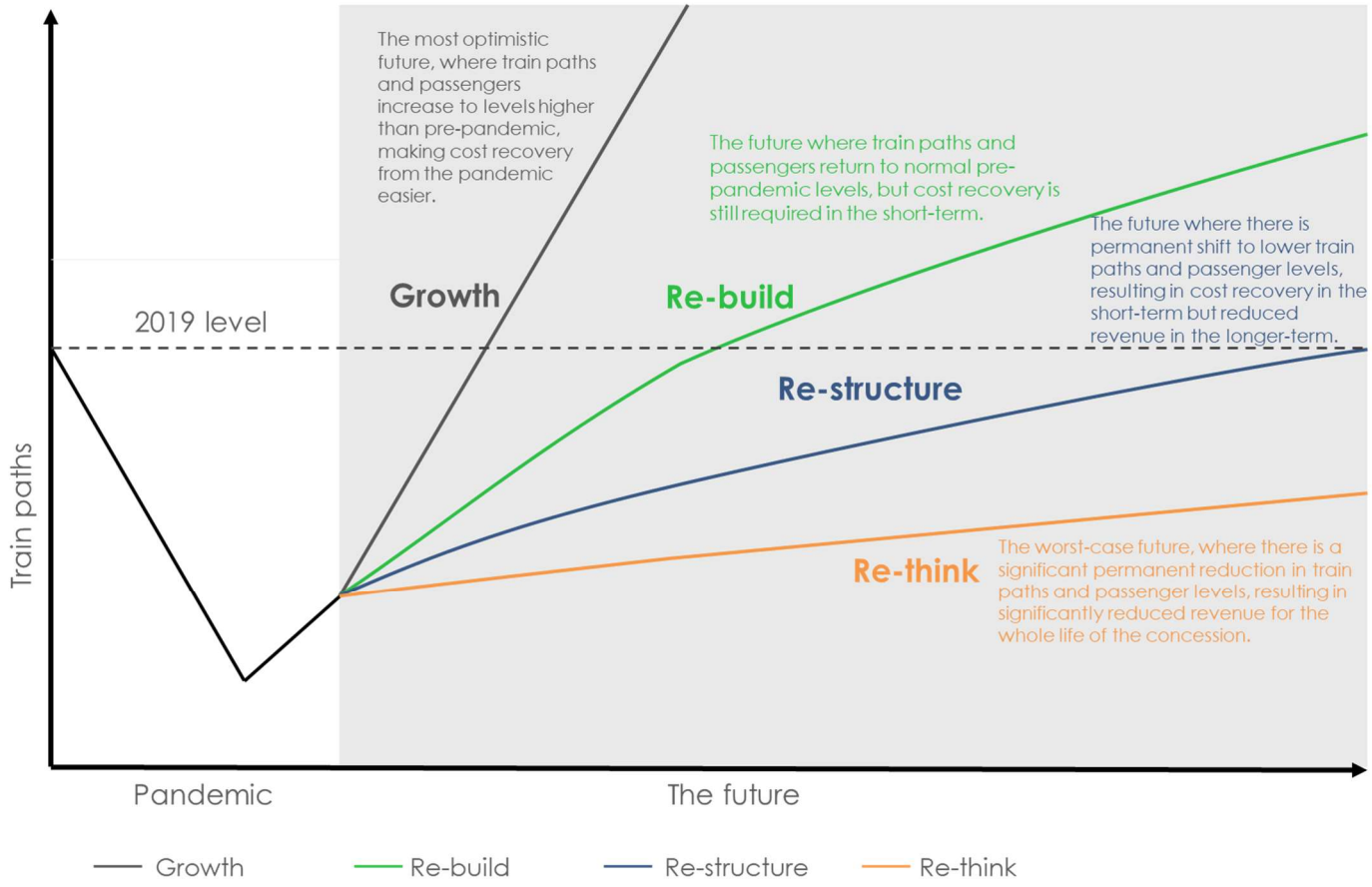
To help navigate uncertainty, our SAMP provided asset management options set out in four reference future states which are shown in the diagram below. We expected that the most likely future state would be 're-build' however we recognised that a range of future states needed to be considered: what could we do to support 'growth', and how might our asset management approach change under 're-structure' or 're-think'?

The 40-year train path forecasts which were used to develop the four reference future states are updated every six-months and detail on these have been included in the 5YAMS. However, the overarching principle remains the same: to consider all future states and adjust our asset management approach depending on the demand.

Since 2022 international train paths have made a strong recovery back to pre-pandemic levels. Domestic train paths were slower to recover but are now close to pre-pandemic levels. The recovery in passenger demand to date is comparable to the 're-build' scenario.

Our objective with this document is to set out the process we will follow with our strategic partners to develop optimised and efficient asset management plans that consider a full range of options. This will ensure our asset management activities are resilient and efficient.

Figure 2: Our reference future states (illustrative only)



Expectations of our strategic partners are set out within section 4 of this strategic asset management plan. However, in relation to the future of our assets in particular we requested 4 high-level scenarios from our strategic partners, one for each future state. These ensured that we fully considered all possible options and enabled us to agree a consensus on the costs of delivering the railway with our customers. These scenarios have set out the expected condition for the assets at the end of the concession, for each future state, along with the associated costs.

To support our strategic partners in the development of the different scenarios and condition estimates, we will continue to lead engagement with our regulators, through our established relationships with both the Office of Rail and Road and Department for Transport.

One of our principles is to be agile. We expect our strategic partners to be adaptable to whatever future state we find ourselves in. When planning for each future state, ideas and scenarios may be generated that could add value to the core future state. It will be important to capture opportunities and lessons learnt through the planning process to ensure that all plans provide the best value. This is set out using the asset management objectives.

3 Our asset management objectives

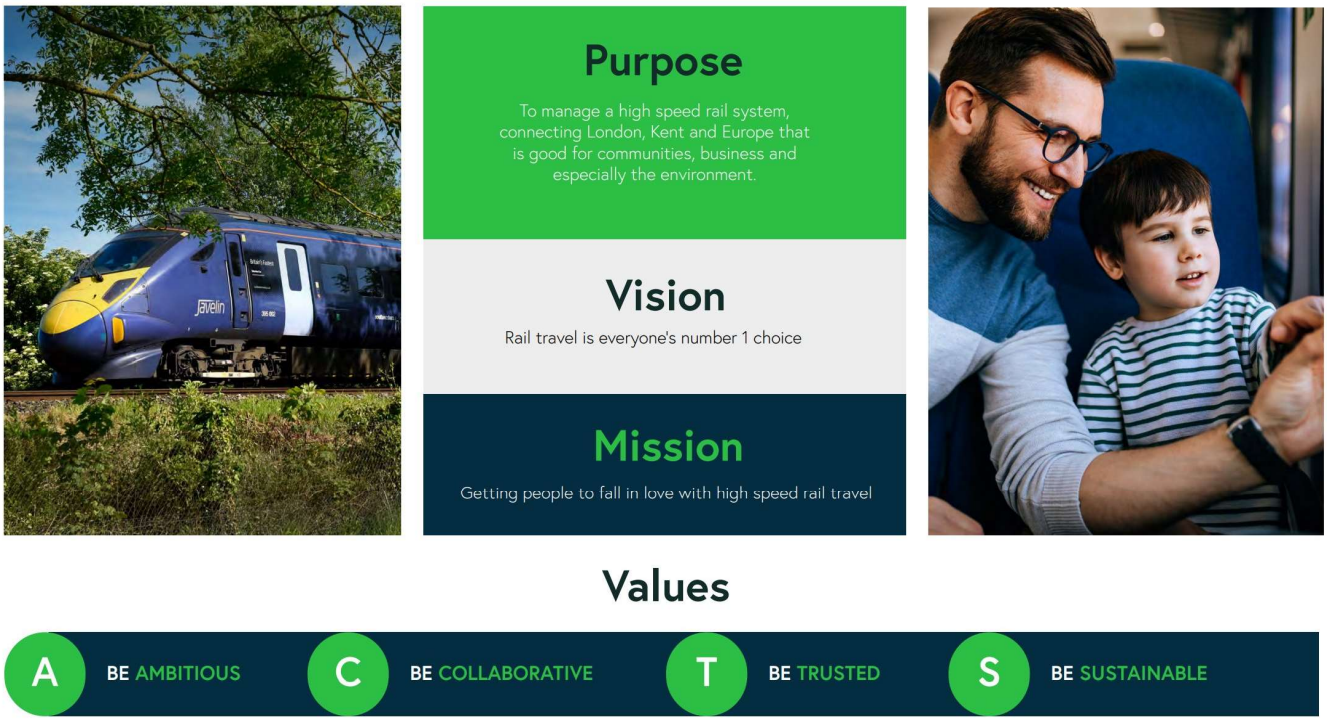
Within HS1 we are united around our asset management policy and we all have a role in delivering our asset management objectives. Our asset management objectives are based on our organisational purpose and vision and have the full backing of our senior management team.

This is about more than executing our duties set out in the concession agreement, this is about how we continually add value to our business, reduce cost, control risk and improve performance.

We use our asset management objectives to define the outcomes to be achieved by us, and our strategic partners. Further – using our asset management objectives is the primary methodology by which cost is balanced against the other outcomes to be achieved.

3.1 Our organisational objectives

Figure 3: HS1 purpose, vision, and values



HS1 is operating in an uncertain macro-economic and geopolitical environment, therefore we have updated our strategy to reflect this, to focus on our core operations and drive modal shift to rail, supporting our customers and future growth.

Our purpose, vision and values drive the outcomes we want to achieve through our ownership of our infrastructure, this is achieved through our five business priorities. The vision and values provide the overarching framework in which we set out our asset management objectives (AMOs).

3.2 Asset management objectives

The asset management objectives listed below in Table 1 consider our legal, regulatory and stakeholder requirements.. Environment and social also now features as a standalone objective, reflecting the current challenges around sustainability including carbon net zero, environmental and social impacts. An objective for growth is also included, reflecting the needs of our shareholders.

The AMOs are further expanded in Appendix 6 which includes additional subtext and KPIs where necessary, to ensure the AMOs are sufficiently specific and measurable.

The importance of each objective varies under each scenario, as shown by the different weightings. The weightings are used by our strategic partners to determine the criticality of an asset to achieving the objectives.

Table 1: HS1 Asset Management Objectives (AMOs)

Business attribute	Asset management objective	Weighting for each future state			
		Growth	Re-build	Re-structure	Re-think
Safety	We will manage our assets so that the risk of a safety incident is as low as reasonably practicable.	40%	40%	40%	40%
Performance	**Punctuality** - We will manage our assets so that passengers arrive on time. **Availability** - We will manage our assets such that the availability of route assets will meet the needs of our passengers and the train operating companies. **Satisfaction (stations)** - We will manage our assets to maintain the asset related elements of the NRPS score at or above the current levels of scoring. Recognising the importance of station architecture, internal design, cultural significance and general ambience in influencing passengers' experience.	30%	30%	25%	20%

Cost effectiveness	We will ensure that the total cost (operational and capital) of managing our assets (over the concession time period) is demonstrably cost effective and provides good value whilst balancing external cost pressures with the need to minimise risk and maximise performance.	10%	15%	25%	35%
Environment and social	We will manage our assets to enable our sustainability strategy, which includes six priority areas: climate change and adaptation; energy management; resources and waste impacts; biodiversity; social value; and transparency.	5%	5%	5%	0%
Growth	We will manage our assets to support long-term growth in capacity and revenue, taking future demand into account.	15%	10%	5%	5%
Legal compliance	We will comply with all legislation, HS1 consents, Historic England conditions, concession agreement, (station) leases and environmental policy commitments.	Mandatory	Mandatory	Mandatory	Mandatory

3.3 How asset management objectives are used to support periodic review

In October 2009, the Office of Rail and Road (ORR) published a statement setting out their approach to the regulation of the HS1 network. Subsequent periodic reviews have been generally consistent with this approach. Revisions have been made to align the DfT regulation of stations with the ORR's role as the rail regulator, and in 2022 the regulation of station assets has been moved to the ORR.

The periodic review process is important, as this is the principal mechanism for realising changes to costs in response to the current and anticipated strategic context.

Figure 4 sets out the key milestones in the periodic review process and how the asset management process fits in, with more detail provided in appendix section A1.4.

Figure 4: Periodic review key milestones and asset management process

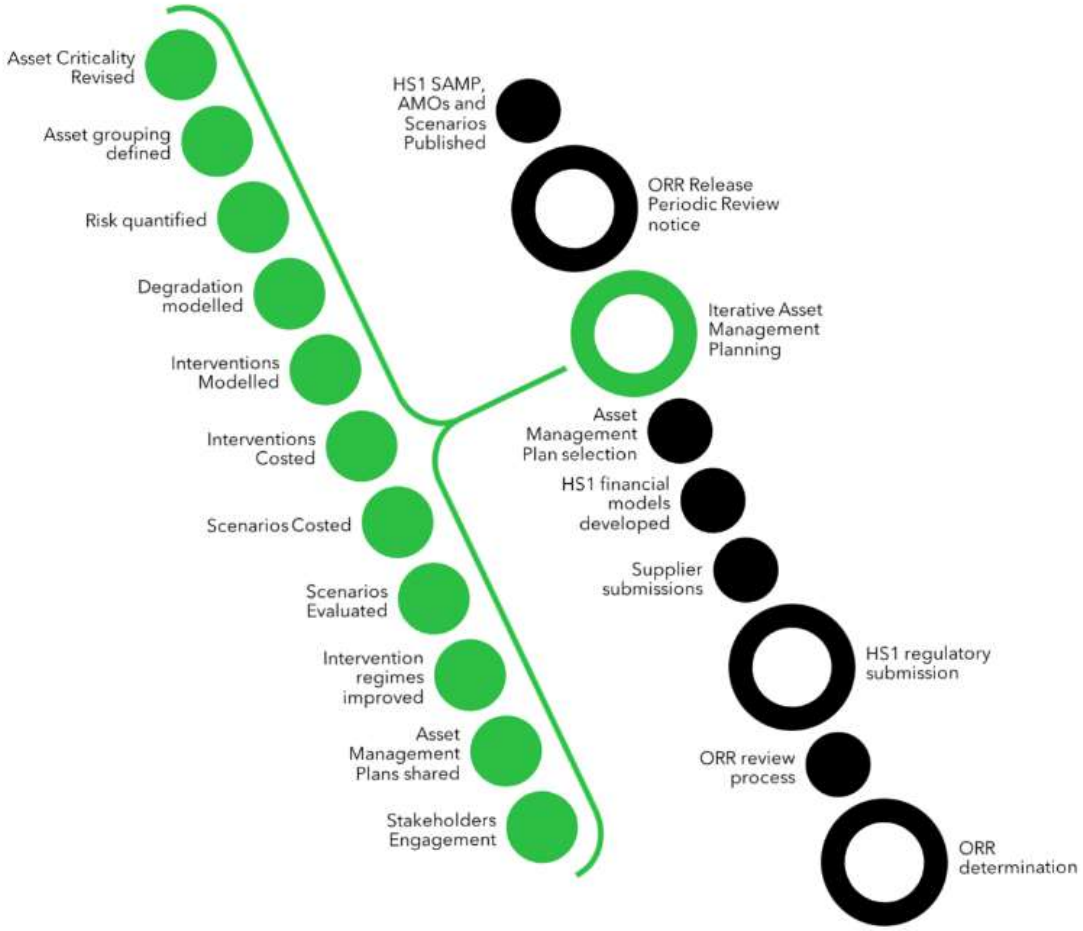


Table 3 in the appendix A1.3 sets out the key activities to be undertaken by HS1 strategic partners within the development of their asset management capability and in support of the iterative asset management planning process. This list provides guidance and is not to be considered exhaustive, HS1 welcomes innovation, continuous improvement, and encourages strategic partners to identify and share asset management best practice.

4 Expectations of our strategic partners

Our strategic partners are critical to our success. We all want to do a good job, continuing to make a positive impact for the communities we serve across London, Kent and across continental Europe.

In addition to setting out expenditure and investment scenarios aligned to the future states, we expect all strategic partners to apply best practice asset management and to be able to demonstrate their maturity level against the ISO standard, through independent assurance and/or accreditation.

This will enable us and respective partners to be agile and meet the challenges of whatever future state we find ourselves in.

We also expect our strategic partners to demonstrate:

- The impact of the scenarios on the HS1 AMOs over a 5 and 40 year timeframe;
- How they will deliver against the HS1 AMOs during PR24. This should include definition of associated measures/KPIs to track progress against achievement;
- The impact on asset condition for each future scenario over a 5 and 40 year timeframe;
- How they will achieve the contractual minimum expected performance in all future scenarios; and
- How they will maintain a base level of asset management system maturity, set out in appendix section A7.5.

4.1 Asset management system documentation

Our partners are required to develop and maintain documentation for their asset management systems, including a plan for continual improvement. The documents and processes listed below are a basic requirement of ISO 55001 and for good practice asset management, therefore we expect all our partners to have these developed as a minimum:

- A strategic asset management plan (SAMP) that sets out the AMOs, the strategy for managing the assets and the strategy for the partner asset management system;
- Asset management plans (AMPs) for each asset type which set out in detail the plan, cost and resources required to deliver the AMOs;
- An asset information strategy (AIS) which sets out a strategy to manage asset information (required for decision making) and an improvement plan;

- A documented decision-making framework, which sets out how investment decisions are made including development of investment scenarios, asset criticality and risk; and
- An asset monitoring and reporting framework that underpins the risk management framework, focused on critical assets.

This is set out diagrammatically with further context in Appendix 5:.

4.2 Asset management plans and underpinning

4.2.1. Developing scenarios

In section 2.2 we set out the reference future states which we expect our strategic partners to use in developing scenarios for their asset management plans. It is essential that the plans are underpinned with high quality evidence, whilst some assumptions will be required, these should be kept to a minimum. The expectations for underpinning evidence include:

- Use of whole life cost models to demonstrate impact of expenditure on risk and performance;
- Use of actual historical cost data to underpin assumptions for future costs in models;
- Use of asset degradation models to understand change in condition over time;
- Use of actual historical quantified and/or empirical condition data to underpin asset degradation models; and
- Where degradation models are not available, then use of expert judgement to underpin assumptions.

4.2.2. Summary of asset condition

We expect our strategic partners to provide a statement of the expected asset condition, for each asset group or system, for multiple time horizons. This includes for 2030, and for 2040 to provide insights into the expected asset condition at handback.

We expect that NR(HS) will continue to use the electronic asset management system (eAMS) for route assets and Concept for Station assets, along with the associated condition scoring framework (scores from 1-5) to collate and report asset condition. This will ensure consistency of reporting and enable trending of data. We also expect all our partners to use the latest technologies to help understand asset condition, such as remote condition monitoring and live telemetry data to inform of issues before they result in asset failures.

The route asset condition information will be transferred to a replacement eAMS system at the start of CP4 once an appropriate solution has been identified, approved and implemented.

4.3 Asset criticality

Criticality is the importance of an asset group or system in delivering the asset management objectives, in the context of the probability of the asset group or system failure. We expect our strategic partners to understand the criticality of the assets and ensure that criticality informs investment decision making to ensure that critical assets and systems are prioritised. Our partners will also be able to articulate how they determine asset criticality and how it changes over time.

Understanding the relative importance of asset systems helps determine the focus for maintenance expenditure and renewal activity, especially if the budget available is constrained. Importance also helps define redundancy in design performance standards or the factor of safety required to be designed into the assets. The importance of the system will also help define which systems need contingency plans should an asset fail.

Our approach to criticality is described in Appendix 4.

4.4 Risk management

We expect our strategic partners to be able to identify, assess and manage risks their assets pose to the achievement of the AMOs. Risks should be articulated in terms of consequence of impact and probability of occurrence. Best practice risk management allows for risks to be monetised, in terms of consequence cost and cost of treatment, however in practice many organisations will articulate risk as a score on a risk matrix. Risks should also be clearly differentiated from issues, as risks by definition have not occurred yet. Our partners will clearly define their risk management frameworks in the own SAMPs including how risk informs asset related decisions.

Understanding the cause of failures is critical in determining the risk of it happening again and defining the suitable mitigation, therefore we expect our partners to be conducting fault tree analysis on failures to understand root causes. This type of analysis should be used to inform probability and impact of the risk assessment.

It is our intention to develop a common risk framework which can be applied across all our partner organisations, allowing us to understand where the highest risks are on a common basis, this will be done in collaboration with our partners.

We require our partners to consider resilience as part of the risk management approach, this includes monitoring assets to understand where failures might occur before they do. Resilience should also consider the impact of externalities such as flooding, power outages and terrorism.

APPENDICES

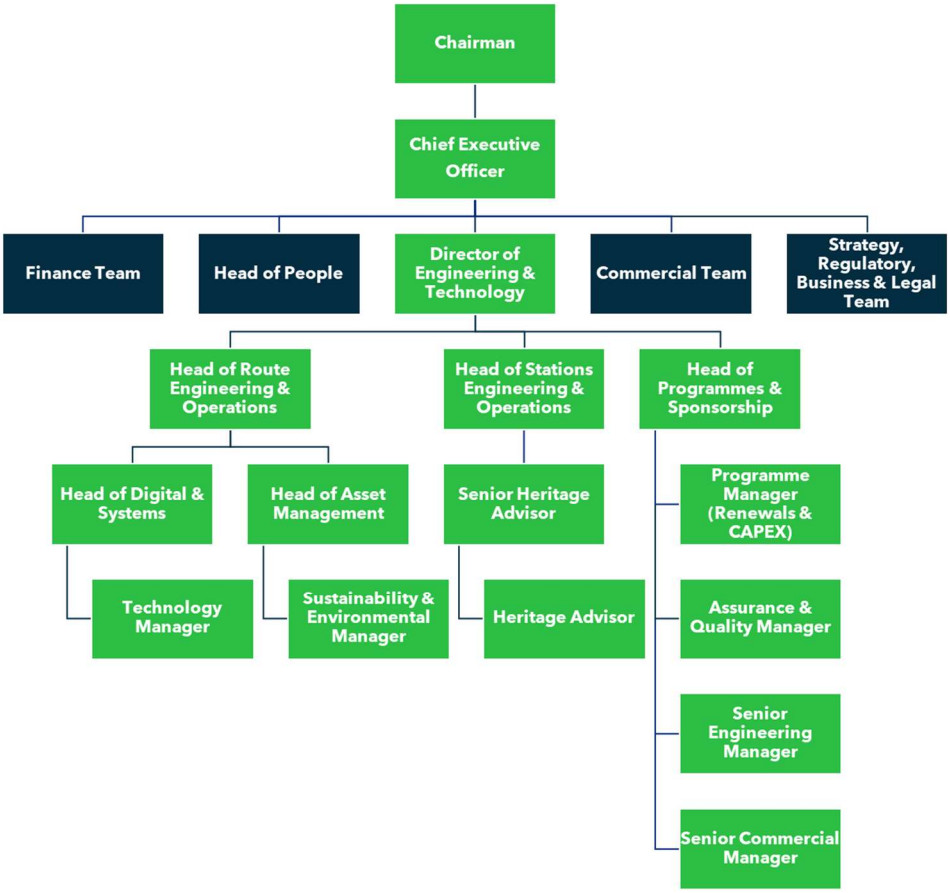
Appendix 1: Context of organisation

We have the 30-year concession to own, operate and maintain High Speed 1 (HS1), the UK's only high-speed railway, as well as the stations along the route: St Pancras International, Stratford International, Ebbsfleet International and Ashford International.

HS1 is the 109km rail line between St Pancras International in London and the Channel Tunnel and connects the international high-speed routes between London and Paris, London and Brussels and London and Amsterdam, as well as the domestic route from London to Kent. Our railway infrastructure has physical connections with Eurotunnel, the DBS freight depot at Dollands Moor and the Network Rail classic railway at Ashford, Ebbsfleet, Ripple Lane and domestic lines north of London. We operate domestic (SE Trains Limited) and international (Eurostar International Limited) services, and also accommodate freight services.

A1.1 Organisational roles

Figure 5 - HS1 organisational chart – asset management roles



A1.2 Stakeholder relationship overview

Figure 6: HS1 contractual framework

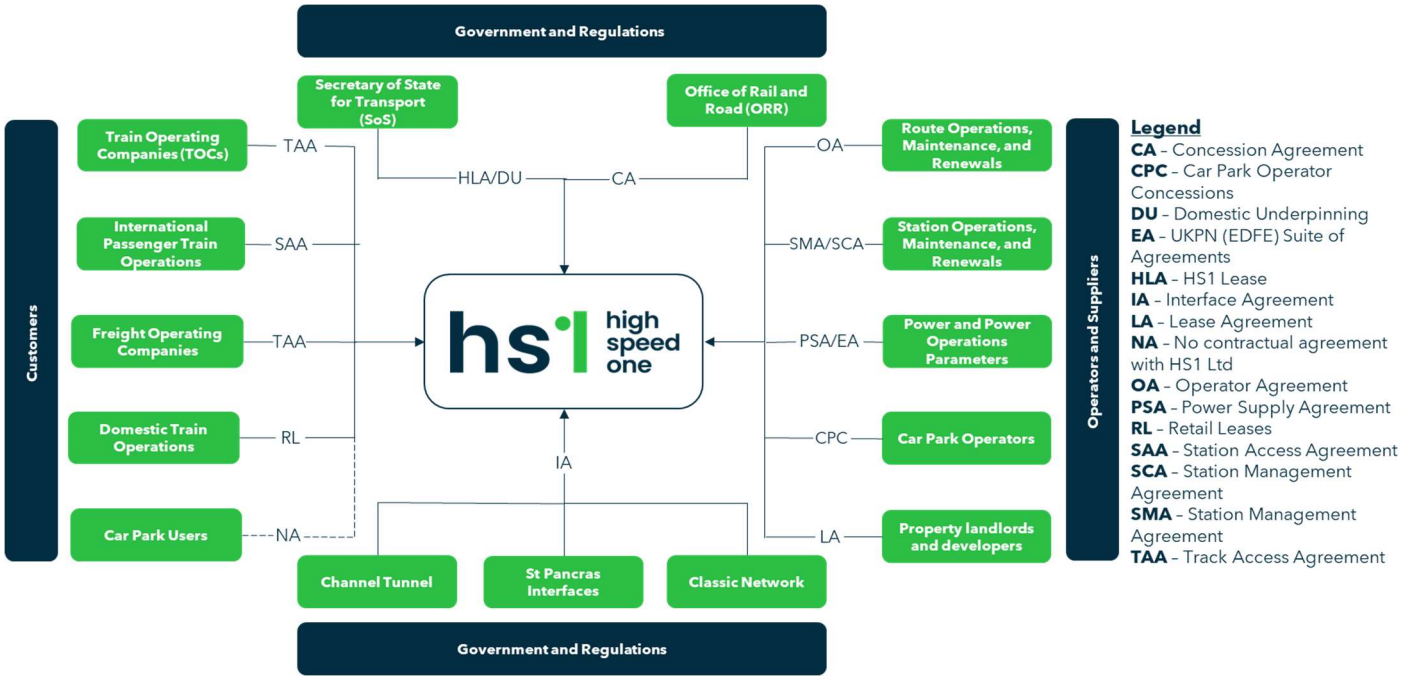


Table 2: Stakeholder relationship overview

	Stakeholder	Overview
Government and regulations	Department for Transport (DfT) *Via Secretary of State for Transport (SoS)*	The DfT is the government department responsible for the transport network including HS1. The department is run by the Secretary of State for Transport. Their main role is the landlord of the railway and station infrastructure assets uinder the conccession.
	Office of Rail and Road (ORR)	As our regulator, ORR is a non-ministerial government department responsible for the economic and safety regulation of Britain's railways and monitoring of National Highways. The ORR is responsible for approving track access to the HS1 network for train operations, conduct periodic reviews including current performance and interim access charges reviews.

	Stakeholder	Overview
Customers	Train Operating Companies (TOCs) & Freight Operating Companies	TOCs provide the funding for the operations, maintenance and renewals works through the purchase of train paths from HS1. They are consulted on the determination documents and complex projects. They also have the opportunity to provide comments on the annual statements. As a key stakeholder the TOCs are kept regularly informed of progress and consulted on individual projects where applicable. TAAs set out the terms and conditions for access to the HS1 track and incorporate the HS1 Passenger Access Terms (PAT) or HS1 Freight Access Terms (FAT) as appropriate and include track charges, the performance regime, the possessions regime and periodic review provisions. Framework Track Access Agreements (TAAs with a duration of more than one year) require ORR approval. HS1 has granted SE Trains Limited and Eurostar International Limited ("EIL") access to the HS1 network through the relevant Track Access Agreements (TAAs). Certain revenues obtained by HS1 from SE Trains Limited are underpinned by HMG's Department for Transport. East Midlands Railway has a Stations Access Agreement with HS1 and contributes towards funding of stations assets and services.
	Station retailers and car parking facilities	Station retailers and car parking at stations provide unregulated income to HS1 Ltd. The retailers' and the car parking facilities' owners would expect that each station be in good condition, and be accessible to any station users and passengers as described in the Station Access Agreement.
Strategic Partners	Network Rail High Speed Ltd. (the 'Operator')	HS1 subcontract with NR(HS), a wholly owned subsidiary of NRIL, to operate, maintain, renew and replace the HS1 route assets and three stations (St Pancras International, Stratford International and Ebbsfleet International) on our behalf. NR(HS) holds the safety authorisation as the Station Facilities Operator and our relationship with NR(HS) is governed by a Station Concession Agreement. The Operator is required to comply with the Station Concession Agreement and Operator Agreement and to undertake good Asset Stewardship of the 'OA Infrastructure'. NR(HS) has two functions that we engage with regularly: Route and Stations, who manage different parts of our infrastructure.
	UK Power Network Services	UK Power Network Services financed, designed, built and now operates, maintains and renews the electricity substations and high voltage distribution network under a series of agreements, which expire in 2057. The agreements encourage performance improvement, with incentives based on the impact of outages on HS1. The agreements also promote information sharing which helps the planning process and facilitates better integration of maintenance and renewals with the rest of HS1's strategic partners. Asset management commitments have been included within the arrangement between HS1 and UKPNS, which includes a stronger emphasis on asset stewardship.

Stakeholder	Overview
ABM	ABM is appointed by HS1 Ltd as the Station Facility Operator to operate, maintain and renew the international section of Ashford International Railway Station on its behalf. The relationship between HS1 and ABM is governed by a Station Management Agreement. ABM have a licence to operate the station from the ORR. ABM is responsible only for asset management at Ashford International with EIL responsible for railway operations. ABM also holds the Safety Authorisation and is required to undertake periodic station audits and inspections which include safety.
Shareholders/Investor	The shareholders/investors have a reasonable expectation that HS1 has adequate resources to continue in operational existence for the foreseeable future. Relevant key factors include: • The Company demonstrates satisfactory financial resources at the balance sheet and future cash flow projections; and • The Company operates in a low risk, stable regulatory and commercial environment as noted in the principal risks and uncertainties section of the Strategic Report.
Passengers	Passengers have high overall expectations of their train journeys and station services. They expect their train tickets provide value-for-money, the provision of train services achieving high punctuality/reliability, an acceptable level of crowding, passenger-centred delay handing approach. These expectations are reflected in the National Rail Passenger Survey.

A1.3 Partner activities to inform the periodic review process

Table 3: Partner activities to inform the periodic review process.

Strategic partner activity	Description
Asset criticality revised	Partners use revised AMOs to review Asset Criticality. The asset management criticality is the relative importance of an asset group or system in delivering the Asset Management Objectives, in the context of the probability of the asset group or system failure to be available for its purpose.
Asset grouping defined	Partners grouping asset groups and systems to allow for the efficient consolidation of asset knowledge. Attributes may include, but are not limited to, condition, capacity, utilisation, and would be expected to be made with historic, current and forecast operational contexts. This should be undertaken in the context of the HS1 Asset Information Strategy and the HS1 Asset Information Vision: supporting intelligence led asset management.
Risk quantified	Partners quantify risk for each asset group or system, described through failure to meet the asset management objective. Risk can be understood through application of performance, reliability, availability, maintainability and safety methodologies.

Strategic partner activity	Description
Degradation modelled	Partners use the accumulated asset knowledge to model predicted degradation of asset health over the asset lifecycle for each group or system, mapped to the HS1 regulatory business planning cycles. Specific time periods will include current and future Control Periods as well as a sufficient forward projection to inform 40 year whole life cost analyses. This degradation is to be modelled within the context of the future states and scenarios as set out in this document.
Interventions modelled	Partners set out intervention strategies for each asset group or system, informed by the degradation modelling, to include operations, maintenance and renewals, and predicting intervention impact on asset health.
Interventions costed	Partners model costs of interventions, both through top-down portfolio analysis, as well as bottom-up unit rate analysis per intervention per asset group or system. To support the costing of the interventions, the capabilities and competencies, and processes and systems, are to be defined and collated such that required resourcing per intervention can be determined. These costs are expected to be estimated within historic, current and forecast operational contexts, and are to be made for the core future state to support the CP4 submission with additional consideration for how the plans would change for the alternative future states set out.
Scenarios costed	Using the costed interventions for each asset group or system, within the context of the possible future states, partners determine cost estimations for each scenario and future state.
Scenarios evaluated	Supported by HS1 and through stakeholder engagement, partners combine intervention options and costed scenarios to evaluate options with impact described in terms of the HS1 asset management objectives over a 5 year and 40 year timeframe.
Intervention regimes improved	Supported by HS1, partners identify improvements to the different intervention options through an iterative process. This can include, but is not limited to, cross-disciplinary reviews, and engagement across different partners, or through the use of subject matter experts and external benchmarking.
Asset management plans shared	Partners share asset management plans over a 5 year and 40 year timeframe responding to the scenarios and future states, in terms of asset management objectives, setting out benefits, drawbacks, risks, and opportunities.
Stakeholder engagement	HS1 facilitates stakeholder engagement which further informs development across each aspect of asset management planning.

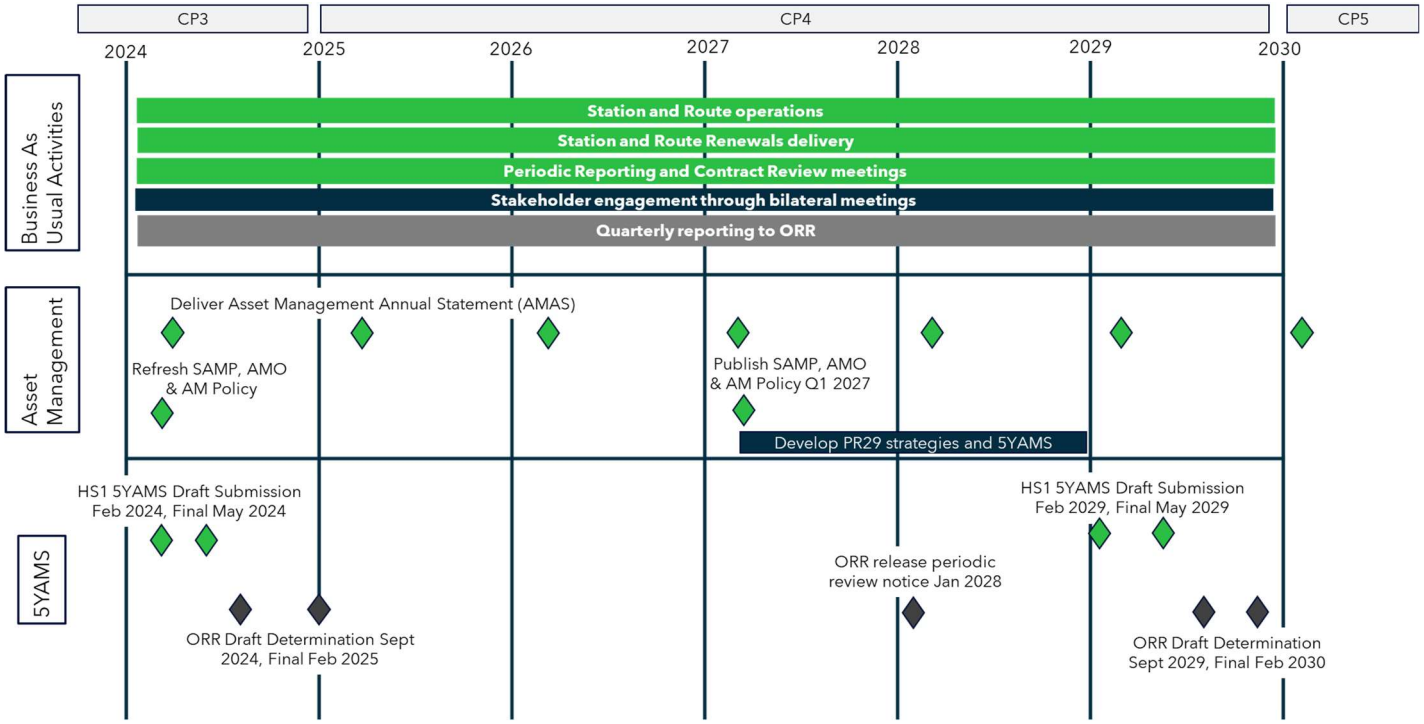
A1.4 Key milestones for the strategic planning process

Table 4: Key milestones for the PR24 process

Key milestones	Description	Date
HS1 strategic asset management plan, asset management objectives and scenarios published	As set out in this document, HS1 has reviewed and revised the asset management objectives to be used to understand the relative importance of each asset group or system. HS1 has also set out possible future states and developed scenarios to be used by partners to support partner iterative asset management planning. In parallel with the preparation of asset management plans, partners are expected to improve their asset management capability in preparation for the ORR's release of the periodic review process document. Outcomes: HS1 strategic asset management plan, asset management objectives, preparation of partner asset management plans and capability improvement.	From May 2022
ORR approach to periodic review	The ORR consulted on it's PR24 Approach and Process in 2022.. Notifying HS1 Ltd and stakeholders of the approach and process it intends to adopt for the periodic review. Outcomes: Publised the final decision in Jan 2023 which guided the development of the PR24 submission.	January 2023
Iterative asset management planning	Partners will undertake an iterative process to respond to the future scenarios and develop asset management plans with the best outcomes described in the context of the asset management objectives. This will be informed by this HS1 SAMP document and the expected subsequent asset management capability improvement to be undertaken by HS1 partners thereafter. During the iterative asset management planning, HS1 will facilitate stakeholder engagement to test and develop the scenarios. Outcomes: Asset management plan development.	
Asset Management Plan selection	Following the iterative asset management planning processes, final asset management plans are to be selected to be developed as the basis of regulatory submission. Outcomes: Finalised asset management plans.	October 2023
HS1 Financial models developed	Governed through the terms of the concession agreement, HS1 produce financial models used to support the creation of the 5YAMS, notably used to set out proposed access charges, that are regulated by the ORR. Outcomes: HS1 financial models.	December 2023
Partner submissions	HS1 and its partners will work closely to create a coherent regulatory submission. In line with the various partner obligations, partners will provide their submissions to HS1, to be appended to the overall regulatory submission to the ORR. Outcomes: Regulatory submissions to HS1.	January 2024

Key milestones	Description	Date
HS1 Ltd submits draft 5YAMS to ORR and commences formal public consultation	In line with schedule 10 of the HS1 concession agreement, HS1 will submit a draft 5YAMS to ORR and will commence a formal public consultation, during which period formal representations from key stakeholders are anticipated, including (but not limited to) train operating companies. This must occur at least 13 months prior to the end of CP3. Outcomes: Draft 5YAMS submitted to ORR, formal public consultation process initiated.	February 2024
HS1 Ltd shall produce and submit to ORR the Final 5YAMS	In line with the HS1 concession agreement, HS1 submits a final regulatory submission to the ORR at least 10 months prior to the end of CP3. Outcomes: Final 5YAMS submitted to the ORR.	May 2024
ORR review process	Following HS1's submission of the final regulatory submission, the ORR scrutinises the finalised plans, issue a draft determination, and commence a public consultation. This must occur at least 6 months prior to the end of CP3. During this consultation HS1 may make amendments to the 5YAMS, or submit additional information, in response to ORR findings. Outcomes: Draft determination by ORR.	September 2024
ORR determination	The ORR will issue their final determination, as set out in HS1 Ltd's passenger and freight access terms. ORR will publish an implementation notice by the end of April 2025 that will implement the final determination through amendments to the track access contracts, passenger access terms and freight access terms. The ORR determination must occur at least 60 business days prior to the end of CP3. HS1 Ltd will then submit a revised Final 5YAMS in line with ORR final determination, within 20 business days of the ORR's final determination. The final determination will be adopted and implemented at the start of the new control period (CP4) on 1st April 2025. Outcomes: Final determination by ORR.	ORR Determination - January 2025 Final 5YAMS – February 2025

Figure 7: Business planning process diagram



Appendix 2: Further context for strategic drivers

A2.1 HS1 key business priorities

Deliver the core

- Safety: continue to deliver safety improvements for customers and workers including trespass reduction interventions.
- Asset: use our asset management strategy and knowledge of the asset to further enhance renewals, operations and maintenance (O&M) performance.
- PR24: deliver high-quality asset stewardship.

Driving modal shift

- Borders: develop a post-brexit border solution.
- Domestic: find the optimum solution to grow services.
- Sustainability: push for Modal Shift and great connectivity by promoting the high speed service and green credentials.

Growth

- Competition: Act on opportunities to grow the international market and support the recovery of domestic train paths.

A2.2 Sustainability

We aim to provide the most sustainable option for transport across the UK and Europe and to protect and reduce our impacts on the natural environment and on our local communities.

Our sustainability strategy is aligned to creating a more sustainable and environmentally friendly future. There are six areas of priority, which are core to the strategy. Each priority area has defined targets which we are committed to achieving.

We have an important role to play in society in offering low-emission transport for the future. We are continuously looking to further reduce our impacts on climate change and ensuring the resilience of our infrastructure to account for future climate change. In line with our pledge to be fully carbon neutral by 2030, we are working with partners and stakeholders to develop a green energy procurement strategy. The strategy will include a mix of options such as energy reduction and efficiency and sourcing energy from green generation. We have already taken the first steps to achieving green energy generation.

We look to minimise energy use wherever possible, working with our partners to identify and implement energy efficiency measures, and building on the work we have already done such as upgrading to more efficient LED lighting. We are also developing standards which will be applied to those working on our infrastructure where applicable, outlining principles of energy minimisation in construction, operation, and maintenance. Minimising energy use will also promote cost reductions in a time where there is a particular focus on financial capital.

It is important to use products and materials more efficiently and to reduce waste. We are developing standards for project suppliers so that non-hazardous waste can be diverted from landfill. We are also embedding good practice waste minimisation within our organisation.

We are committed to providing a positive contribution to communities in and around our stations and lineside, and protecting and enhancing the lineside habitat under the requirement of the Channel Tunnel Rail Act 1996.

Our sustainability strategy is aligned with our partners who we work closely with to deliver improvements to the rail industry and promote best practice. We understand that each of our partners will have their own sustainability strategies focused on their specific impacts, but where there is cross over and alignment we will work together for greater gains. The collaboration is overseen by the Sustainability Steering Group, which is formed of senior representatives from all our partner organisations.

A2.3 Growth

In line with our growth objective, we will manage our assets to support long-term growth in capacity and revenue. There is an ongoing opportunity of a modal shift to the rail sector.

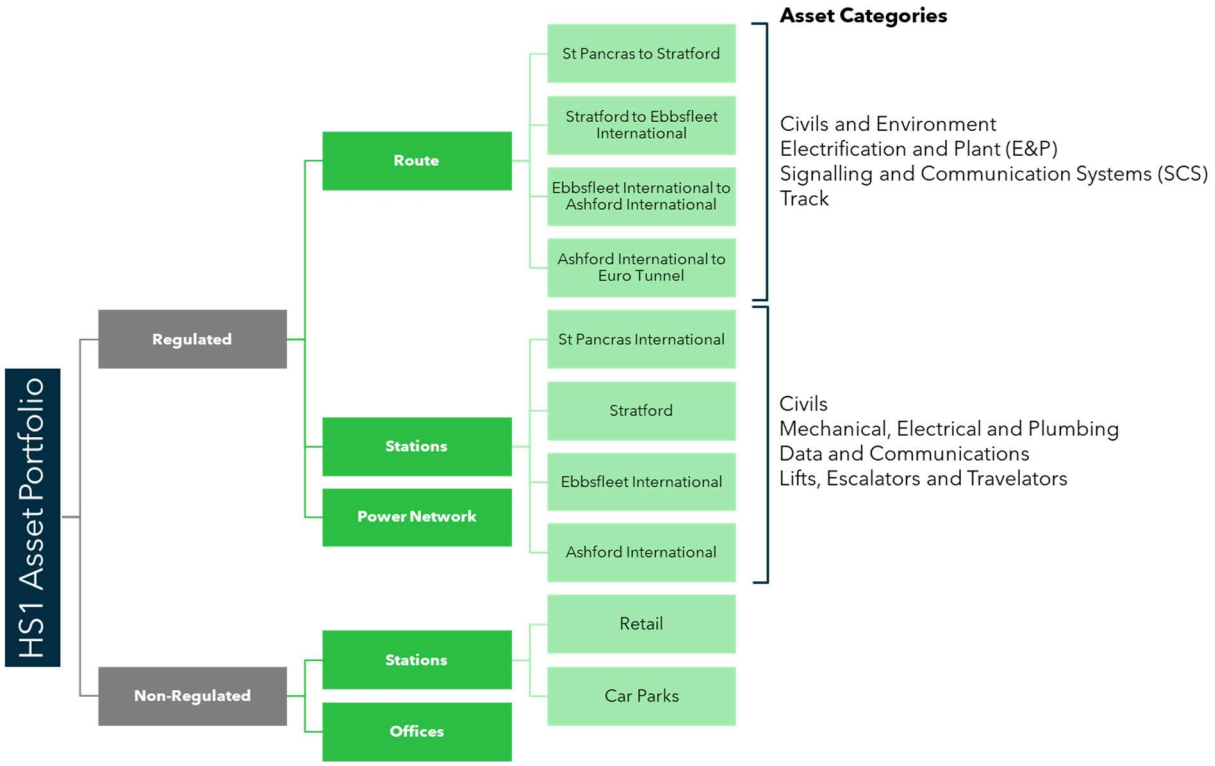
We need to promote recovery in the coming years to encourage growth and we will continue to develop our understanding of what is important to drive this in the uncertain future such as maintaining performance, controlling track access costs, and facilitating new routes and traffic.

We appreciate that there are challenges in terms of growth in the current environment but there are also opportunities that can help push us forward to achieve our objectives.

Our growth masterplan for St Pancras station identifies some of the key constraints and opportunites for assets within St Pancras.

Appendix 3: Overview of our asset portfolio

Figure 8: HS1 asset portfolio



Our corporate strategy informs our asset management policy and directs how we manage our assets. As HS1 operates primarily through an outsourced model, our strategic partners play an important role in the realisation of our objectives. We have developed collaborative working relationships through previous control periods within the concession timeframe and we provide direction to our partners to improve their practices and deliver efficiently, and challenge where appropriate.

A3.1 Route

NR(HS) operates, maintains, renews, and replaces our route assets on our behalf under the operator agreement. It is a long term contract running to 2047, with a right to market test in 2035. The contract includes a fixed price for operations and maintenance, which is determined through the 5-yearly periodic review process. The operator agreement contains separate provisions for renewal and replacement activities and specific additional services.

Historically, route has been divided into four main regions:

- St Pancras to Stratford
- Stratford to Ebbsfleet International
- Ebbsfleet International to Ashford International
- Ashford International to Euro Tunnel

NR(HS) route assets can be split into several categories, covering a multitude of assets:

Table 5: NR(HS) Route asset breakdown

Discpline	Category	Assets
Civils and Environment	Civils and Environment	Access (93,307km), Acoustic Barriers (70), Ancillary Structures (17), Bridges (248, 25.5km), Culverts (115), Drainage (226.5km), Earthworks (167.5km), Fencing and Boundary measures (331.0km), Lineside Buildings (117), Retaining Walls (128, 16.2km), Tunnels (29, 47.643km), Landscaping (324.45ha)
Electrification and Plant (E&P)	Mechanical and engineering (M&E)	Marshalling Boxes (397), Ventilation Control System (VCS) (527), Cross-passage Doors (304), Pumping Systems (1172), Lighting (2566), Uninterruptible Power Supply (UPS) systems (462), HVAC (Heating Ventilation & Air Conditioning) (2639), Fire Systems, Points heating system (1570), Security Systems (25), Lifts, Auxiliary Power Distribution (2429)
	Overhead contact system (OCS)	OCS Grouped and Linear (Virtual Assets) (791), Neutral Section and Section Insulators (121), OCS Tensioning Equipment (Anchors) (1913), OCS Supporting Structures (Masts) (5284)
	Traction power supply (TPS)	HV Switch Gear (257), Traction Bonds (247), Voltage Transformers (63), Surge Arrestors (39), AC/DC Isolation Transformer Compounds (9), Motorised Switch Drives (138)
Signalling and communication systems (SCS)	Signalling and communication systems (SCS)	Signalling: Point Operating Equipment (143), Integrated Train control System (9894), Train Detection (545), Automatic Train Protection (207), Signals (643), Train Dispatch (25), VHME (8), Markers (564), Relays (3400), Lineside Switches (1230) Control Systems: RCCS (13), EMMIS (8), VCS (35) Communication Systems: DTN (92), GSM-R (34), CCTV (80), LAN (1), FON (200 km), FOAEC (60km), RF Propagation System (1), Emergency Radio System (1), Telephony System (1)
Track	Track	S&C (151), Ballast (8.6 t/m), Slab (45km), Buffer Stops (24), Rail Management Products (15), Road Rail Access Points (9), Expansion Devices (17.5), Glued Insulated Joints (~400), Wheel Impact Loading Detector (1)

A more detailed breakdown of asset inventory can be found in the NR(HS) Route SAMP[1]. Each of these asset classes also have dedicated specific asset strategy (SAS) documents[2] which provide more detail.

Given the average condition of the assets it is important that NR(HS) manages assets to optimal sustainable levels in line with the asset management objectives. All asset groups have completed a common suite of maintenance vs renewal appraisals and have WLC analysis performed on each. In previous control periods, the number of renewals was minimal. Moving into CP4, the expected number of renewals is expected to increase.

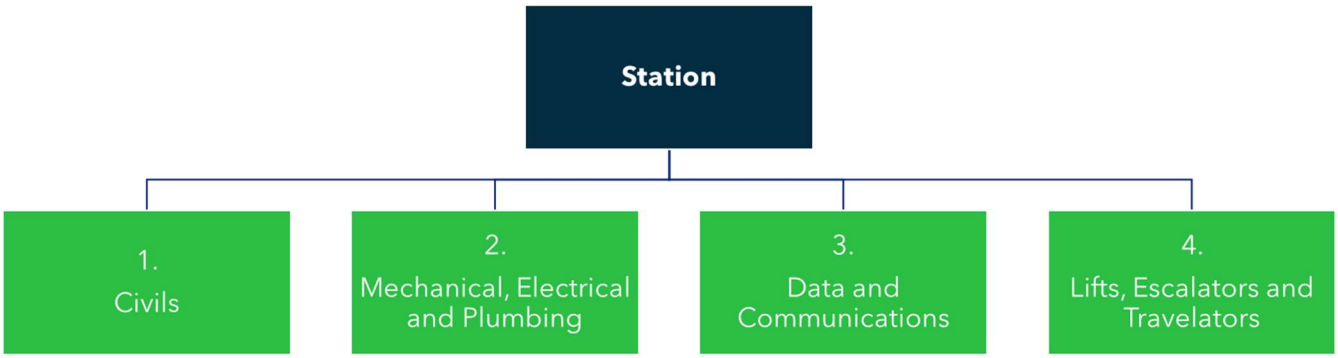
There are opportunities to implement the latest technologies to obtain remote condition information and better integrate end-to-end delivery. Network Rail is developing a holistic approach to IT strategy to support enhanced digital information and visualisation, which will in turn support better decision making. This development will also help address data availability challenges. We have a documented asset information strategy[3] that details our approach to asset information.

A3.2 Stations

NR(HS) Stations

The NR(HS) Stations assets are split into four asset groups, as illustrated below. For each group, details of how the methodologies described in this strategic asset management plan have been applied are described in specific asset strategy (SAS) documents.

Figure 9: NR(HS) Stations asset breakdown



[1] Appendix 2_NR (HS)_SAMP_Sept_2023

[2] Appendix 3_NR (HS)_SAS_Track_Jan_2024, Appendix 4_NR (HS)_SAS_Route Civils_Sept_2023, Appendix 5_NR (HS)_SAS_SCS_Sept_2023, Appendix 6_NR (HS)_SAS_M&E_Sept_2023, Appendix 7_NR (HS)_SAS_OCS_Sept_2023, Appendix 8_NR (HS)_SAS_TPS_Sept_2023

[3] HS1-AMS-007-1 Asset Information Strategy 5.0 Authorised

A challenge faced by NR(HS) Stations is the prioritising of assets. Services have historically been prioritised as assets such as lifts, escalators, lighting, and toilets, tend to have high relative impact on customer satisfaction scores. Due to an increase in incidents around civils and fabric assets, this focus may require shifting. We are continuously collaborating with NR(HS) stations to ensure that investments are appropriately prioritised in accordance with the asset management objectives.

For assets that influence the safety, availability, and punctuality aspects of asset management objectives, NR(HS) undertakes a cost benefit analysis when thinking about major maintenance interventions. NR(HS) stations also use decision support tools to model financial aspects of a range of interventions and asset failures, accounting for changing probability of asset failure, cost of interventions, and cost of asset failure.

It is acknowledged that St Pancras International station, given its Grade I listed status , is an exceptionally significant historic asset which HS1, and thus NR(HS) has a duty to both protect and share. As a result, the station has unique requirements which has a significant impact on the realisation of asset management objectives. There is an opportunity for respective stations to have more bespoke strategies.

ABM stations

Since September 2023 ABM now operate, maintains and renewas Ashford International railway station on behalf of HS1, taking over from the previous supplier (Mitie).

Maintenance of the station's assets is conducted in line with the contract under SFG20. Efficiency has improved over recent years through improvements in digital maintenance.

A key challenge and opportunity going forwards is centred around the strategy of capital replacements. ABM will begin to implement it's asset management system IBMs Sapphire to gather and utilise more real-time data to support decision making as well as improving whole life cost modelling. ABM will also use the IBMs Sapphire dashboard to support asset data visualisation.

Retail trading

The retail estate includes over 60 units across 4 stations, St Pancras, Stratford, Ashford and Ebbsfleet. These brands are defined into three categories: food and beverage, retail, and services. St Pancras station in particular hosts exciting retail brands under one iconic roof.

We aim to set a new benchmark for individuality and quality, providing convenient and memorable touchpoints. This is supported by an operational eco system which removes barriers to trade for tenants and positively encourages consumer spending.

We pride ourselves on consistently delivering a high level of service and we are always aspiring to improve this based on the principle of 'great hosts, inspired guests' and there is opportunity to grow our income through driving sales growth and customer experience.

Car parking

Car parking is a support service to the railway network, and our focus is to maintain a service level and tariff that supports passenger growth on the trains and in turn drives more transactions and unregulated income through the car parks themselves.

Unlike most national railway routes, there is capacity in our car parks though we also operate with a web of legacy agreements, competition and planning constraints that restrict or limit our abilities without significant and/or controversial change.

We manage four car parks consisting of a total of 8,500 spaces. Our customers range from the casual 20 minute user to long term daily commuters. We also have some long term leasing customers and have diversified our business to include some alternative uses for our estate.

Several challenges will impact on all car park estates across the UK in the near future. These factors include:

- Reduction in car ownership
- Autonomous vehicles

A3.3 Power network

UK Power Network Services (UKPNS) provide the traction power distribution system providing electricity to the overhead catenary system which powers the trains. They also provide electricity for electromechanical plant, signalling, stations, shafts, portals, tunnels, and depots along the route.

The assets that UKPNS manage are: three feeder stations, nineteen autotransformer stations and four ODS (Overhead Derived Supplies used for points heating and as backup to signalling supplies) that make up the traction power distribution system for HS1. Assets across 6 No. 11kV networks and one 6.6kV network make up the non-traction power distribution system for HS1.

A challenge faced by UKPNS in managing the operations, maintenance, and renewals of electricity substations and high voltage distribution network is an aging asset base. Consequently, it becomes even more important to ensure that assets are monitored, data is collected and analysed to inform investment decisions and manage risk.

Appendix 4: Asset criticality

To understand the importance of an asset, each asset or group of assets is assessed against each of the objectives and then is scored out of 5 using the guidance in the table below that assesses the impact of failure (not considering the likelihood). Application of this process by all our strategic partners ensures consistency of reporting of criticality.

Table 6: Identifying the importance of an asset to AMOs

Safety	Performance	Cost Effectiveness	Environment and social	Growth	Score
Failure could cause multiple fatalities	Failure causes service suspension of >1 hour Failure leads to complete station or a route outage	Without renewal the total cost of maintenance and renewals in CP4 make this the most expensive asset system Currently does not provide good value nor lowest whole life cost	Severe impact on the natural environment and local communities Not delivering HS1 sustainability strategy and not achieving net-zero ambitions	No capacity provision to support long-term growth Not delivering forecasted revenue	5
Failure leads to single fatality	Failure causes delay to many trains >15 mins each Failure leads to partial system failure at a station or on the route or loss of a piece of passenger sensitive equipment	Without renewal the total cost of maintenance and renewals in CP4 are above 80% of the costs of the most expensive asset system	Medium impact on the natural environment and local communities Delays delivering HS1 sustainability strategy and achieving net-zero ambitions by 1 Control Period	Capacity provision to support long-term growth delayed by 1 Control Period (or reduced by X%) Forecasted revenue decreased by 80%	4
Failure leads to a reportable accident (Riddor)	Failure causes delay to many trains (up to 15 mins each) Failure leads to a loss of passenger sensitive equipment)	Without renewal the total cost of maintenance and renewals in CP4 are between 50-80% of the costs of the most expensive asset system	Mild impact on the natural environment and local communities Delays delivering HS1 sustainability strategy and achieving net-zero ambitions by 3 years	Capacity provision to support long-term growth delayed by 3 years (or reduced by Y%) Forecasted revenue decreased by 50 to 80%	3

Safety	Performance	Cost Effectiveness	Environment and social	Growth	Score
Failure leads to minor injury	Failure causes delay to only a few trains (up to 15 mins each)	Without renewal the total cost of maintenance and renewals in CP4 are between 20-50% of the costs of the most expensive asset system	Leads to an increasing impact on the natural environment and local communities No impact on delivering HS1 sustainability strategy and achieving net-zero ambitions	Capacity provision to support long-term growth delayed by 1 year (or reduced by Z%) Insignificant impact on forecasted revenue	2
Failure does not cause injury	Failure causes no delay Failure has no impact on route and station availability	Without renewal the total cost of maintenance and renewals in CP4 are between 1-20% of the costs of the most expensive asset system. Currently provides good value and lowest whole life cost	No impact on the natural environment and local communities No impact on delivering HS1 sustainability strategy and achieving net-zero ambitions	No impact on capacity provision to support long-term growth Does not impact forecasted revenue	1

The scoring is then weighted using the weighting assigned to each AMP and reference future state. An example is given in the table below for a lighting system and a track renewal.

Table 7: Worked example of impact x weighting for lighting systems and track

System and score	Safety	Peformance	Cost effectiveness	Environment and social	Growth	Total weighted score
Lighting (not emergency lighting)	1	2	3	2	1	
Weighting for future state 1 – **Growth**	0.40	0.30	0.10	0.05	0.15	1.15
Weighted score for future state 1	0	0.60	0.30	0.10	0.10	
Weighting for future state 2 – **Re-build**	0.40	0.30	0.15	0.05	0.10	1.25
Weighted score for future state 2	0	0.60	0.45	0.10	0.10	

System and score	Safety	Peformance	Cost effectiveness	Environment and social	Growth	Total weighted score
Weighting for future state 3 – **Re-structure**	0.40	0.25	0.25	0.05	0.05	1.40
Weighted score for future state 3	0	0.50	0.75	0.10	0.05	
Weighting for future state 4 – **Re-think**	0.40	0.20	0.35	0.00	0.05	1.50
Weighted score for future state 4	0	0.40	1.05	0.00	0.05	

System and score	Safety	Peformance	Cost effectiveness	Environment and social	Growth	Total weighted score
Track renewal	4	4	2	1	2	
Weighting for future state 1 – **Growth**	0.40	0.30	0.10	0.05	0.15	3.35
Weighted score for future state 1	1.60	0.30	0.20	0.05	0.30	
Weighting for future state 2 – **Re-build**	0.40	0.30	0.15	0.05	0.10	3.35
Weighted score for future state 2	1.60	1.20	0.30	0.05	0.20	
Weighting for future state 3 – **Re-structure**	0.40	0.25	0.25	0.05	0.05	3.25
Weighted score for future state 3	1.60	1.00	0.50	0.05	0.10	
Weighting for future state 4 – **Re-think**	0.40	0.20	0.35	0.00	0.05	3.20
Weighted score for future state 4	1.60	0.80	0.70	0.00	0.10	

The overall importance is the sum of the weighted scores and shows us the overall importance of each asset or asset system to achieving our asset management objectives. For the examples above a track renewal would score higher than the non-emergency lighting system renewal in all scenarios, placing track renewals at a higher priority than non-emergency lighting renewal.

Appendix 5: Scope of the asset management system (AMS)

Our asset management system includes an asset management policy, strategic asset management plan, asset management objectives and the processes to achieve those objectives. We will engage with strategic partners to ensure the asset management objectives are cascaded, and that the approach to asset management is consistent. We will define asset management roles and accountabilities between us and our partners.

The scope of the current asset management system includes regulated HS1 assets only, and excludes non-regulated assets. Figure 8 within Appendix 3 details the split of regulated and non-regulated assets across the HS1 portfolio. The non-regulated assets which are currently excluded from the AMS are:

- Offices
- Car parks
- Retail

Future iterations of the AMS will endeavour to include car parks and retail. However, offices are rented properties and therefore not considered necessary for inclusion in the AMS.

Figure 10 below sets out the key components of our asset management system and their relationship to our wider business management system. The three documents at the centre of the AMS are detailed below, as well as the adjacent components of the AMS.

Figure 10: The HS1 asset management system (AMS)

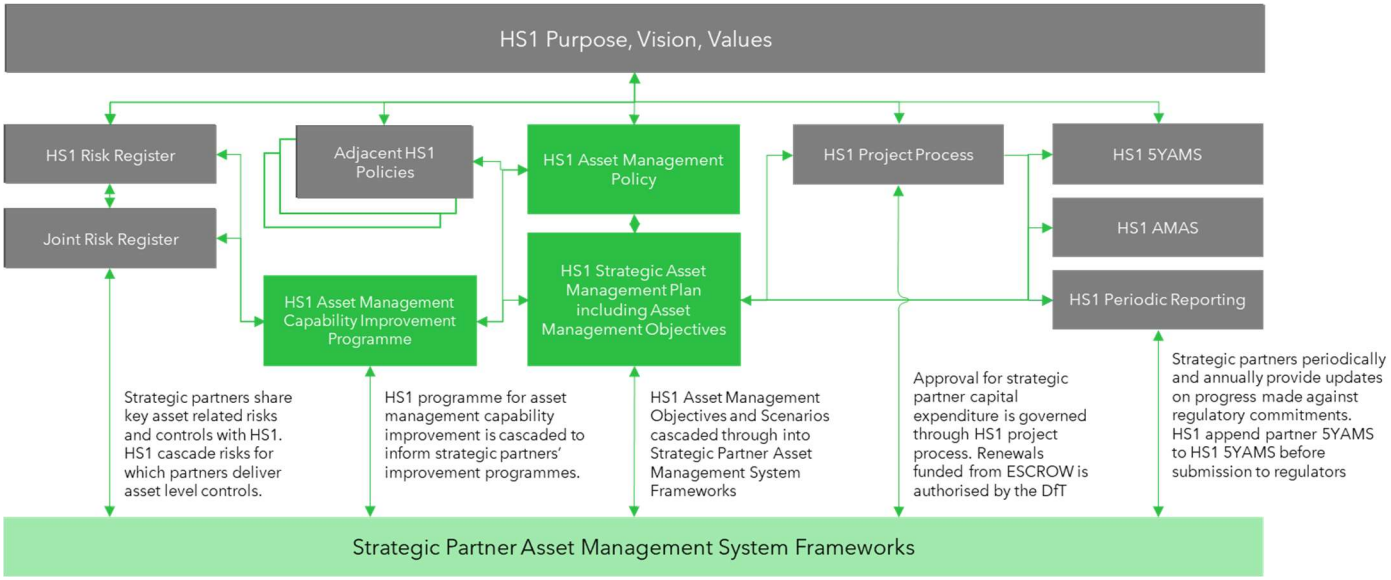


Table 8: AMS component descriptions

AMS component	Description	Review fequency
HS1 asset management policy	Sets out asset management principles aligned to HS1 stakeholders for the whole asset portfolio.	Every two-years
HS1 strategic asset management plan	Sets out the HS1 asset management objectives (AMOs) within a strategic context and setting out the methodologies to be undertaken to deliver those objectives.	Reviewed yearly and updated every three years
HS1 asset management capability improvement programme	Sets out a roadmap for how HS1 and its strategic partners will continuously improve.	Annually

Table 9: AMS adjacent component descriptions

Adjacent component	Description	Review frequency
HS1 risk register	Uncertain events that may cause threats to the delivery of HS1 core purposes.	Quarterly
HS1 project process	The overarching framework and governance for the delivery of projects within HS1, including processes for release of ESCROW funded capex works.	Every two years
HS1 5YAMS	Regulatory document meeting the requirements of the HS1 concession agreement and principally setting out the stewardship of the assets for a given 5 year control period.	Ahead of each Control Period, every 5 years

Adjacent component	Description	Review frequency
HS1 AMAS	Regulatory document meeting the requirements of the HS1 concession agreement and providing an annualised update to the 5YAMS in a given control period.	Published yearly
HS1 periodic reporting	4 weekly reporting in line with the concession agreement, covering asset and operational performance. Informed through strategic partner reporting.	
Strategic partner asset management systems	For each strategic partner, the defined framework setting out the processes and artifacts by which they coordinate asset management activities, delivering the HS1 asset management objectives.	Assurance audits agreed annually through the assurance board

Appendix 6: Asset management objectives

Table 10 - HS1 asset management objectives

#	Business attribute	Asset management objective
1	Safety	We will manage our assets so that the risk of a safety incident is as low as reasonably practicable.
2	Performance	Punctuality - We will manage our assets so that passengers arrive on time.
3	Performance	Availability - We will manage our assets such that the availability of route assets will meet the needs of our passengers and the train operating companies.
4	Performance	Satisfaction (stations) - We will manage our assets to maintain the asset related elements of the NRPS score at or above the current levels of scoring. Recognising the importance of station architecture, internal design, cultural significance and general ambience in influencing passengers' experience.
5	Environment & Social	We will manage our assets to enable our sustainability strategy, which includes six priority areas: climate change and adaptation; energy management; resources and waste impacts; biodiversity; social value; and transparency.
6	Cost-effectiveness	We will ensure that the total cost (operational and capital) of managing our assets (over the concession time period) is demonstrably cost effective and provides good value whilst balancing external cost pressures with the need to minimise risk and maximise performance.
7	Growth	We will manage our assets to support long-term growth in capacity and revenue, taking future demand into account.
8	Legal Complicance	We will comply with all legislation, HS1 consents, Historic England conditions, concession agreement, (station) leases and environmental policy commitments.

In February 2024 we undertook an exercise to make our asset management objectives smarter. Figure 12 shows the outputs of that exercise. Each AMO has been expanded with additional subtext where necessary, which are more specific and targetted objectives. These objectives have also been aligned to specific processes and KPIs which will monitor delivery of the AMOs.

Figure 11: AMOs diagram key

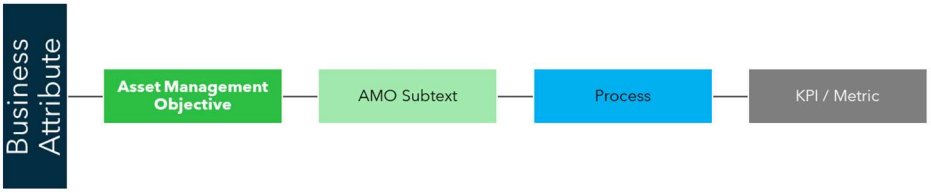
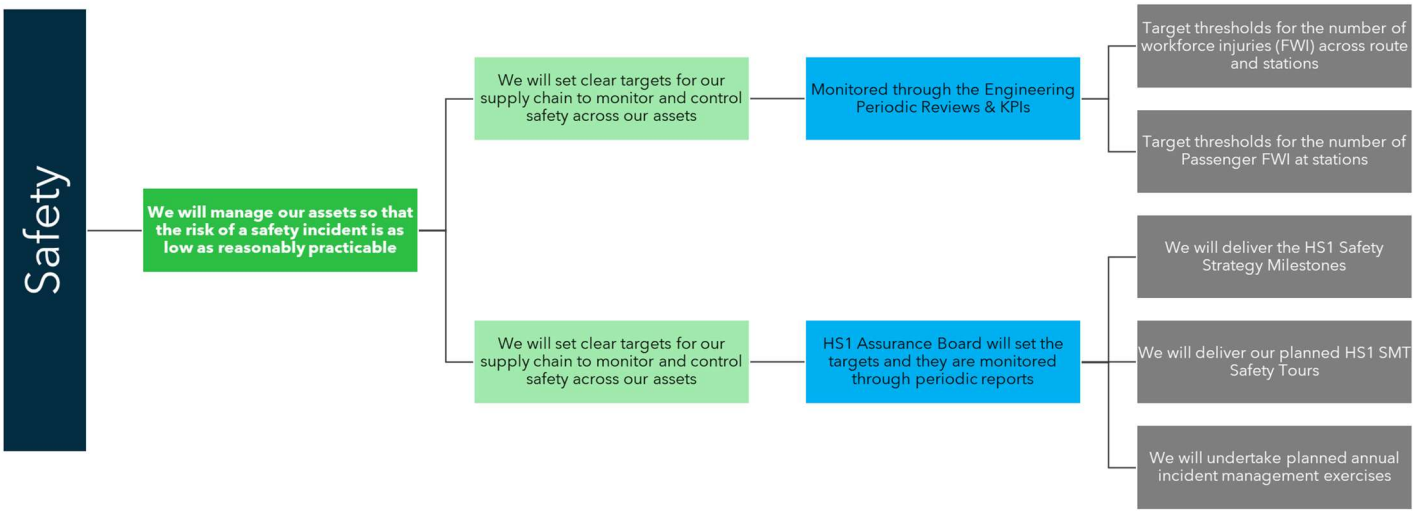
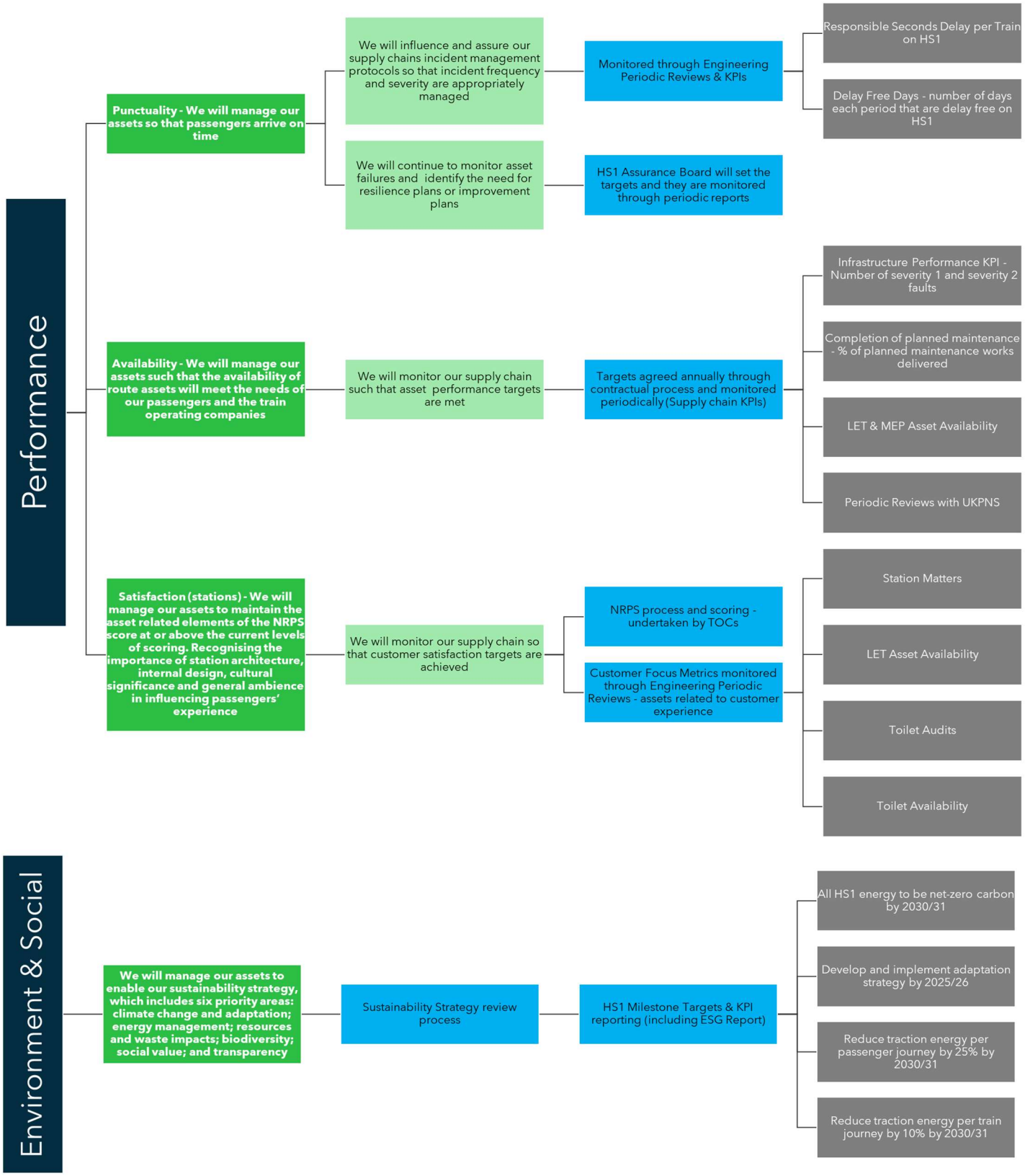
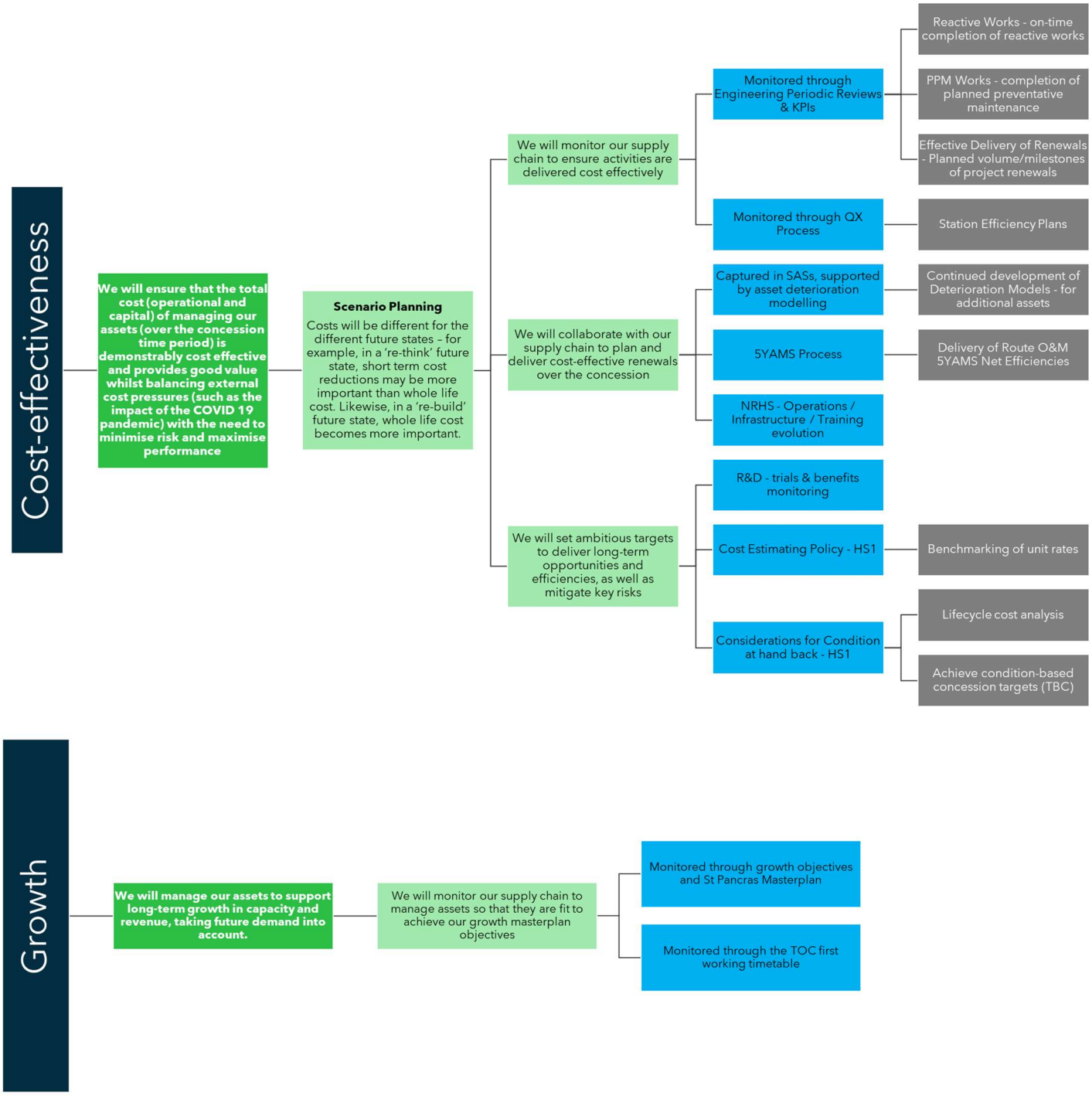
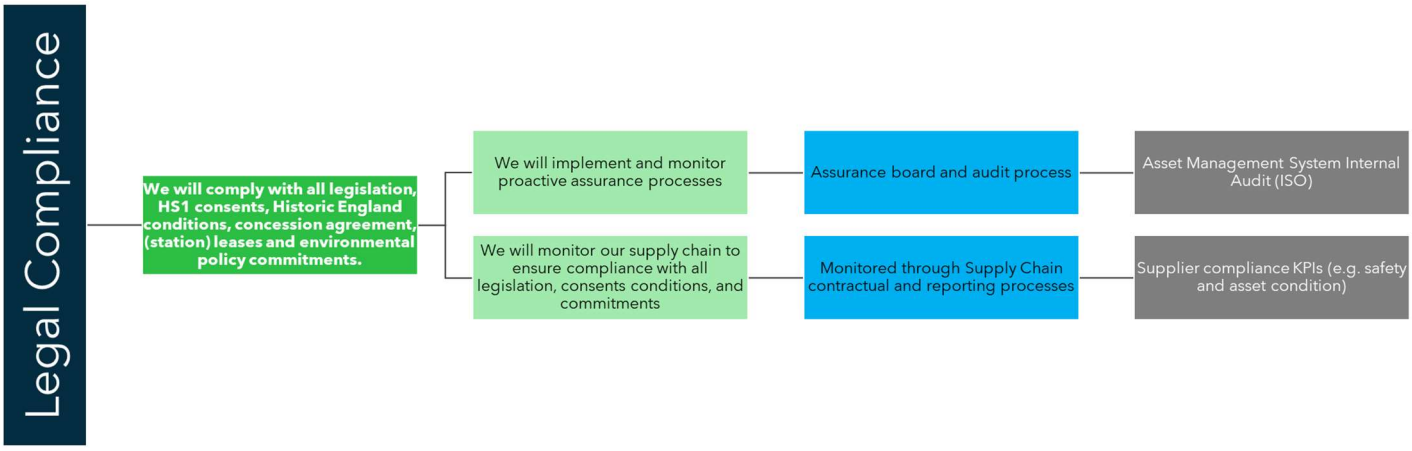


Figure 12: AMOs development




Performance
Punctuality - We will manage our assets so that passengers arrive on time
We will influence and assure our supply chains incident management protocols so that incident frequency and severity are appropriately managed
Monitored through Engineering Periodic Reviews & KPIs
Responsible Seconds Delay per Train on HS1
Delay Free Days - number of days each period that are delay free on HS1
We will continue to monitor asset failures and identify the need for resilience plans or improvement plans
HS1 Assurance Board will set the targets and they are monitored through periodic reports
Availability - We will manage our assets such that the availability of route assets will meet the needs of our passengers and the train operating companies
We will monitor our supply chain such that asset performance targets are met
Targets agreed annually through contractual process and monitored periodically (Supply chain KPIs)
Infrastructure Performance KPI - Number of severity 1 and severity 2 faults
Completion of planned maintenance - % of planned maintenance works delivered
LET & MEP Asset Availability
Periodic Reviews with UKPNS
Satisfaction (stations) - We will manage our assets to maintain the asset related elements of the NRPS score at or above the current levels of scoring. Recognising the importance of station architecture, internal design, cultural significance and general ambience in influencing passengers' experience
We will monitor our supply chain so that customer satisfaction targets are achieved
NRPS process and scoring - undertaken by TOCs
Customer Focus Metrics monitored through Engineering Periodic Reviews - assets related to customer experience
Station Matters
LET Asset Availability
Toilet Audits
Toilet Availability
Environment & Social
We will manage our assets to enable our sustainability strategy, which includes six priority areas: climate change and adaptation; energy management; resources and waste impacts; biodiversity; social value; and transparency
Sustainability Strategy review process
HS1 Milestone Targets & KPI reporting (including ESG Report)
All HS1 energy to be net-zero carbon by 2030/31
Develop and implement adaptation strategy by 2025/26
Reduce traction energy per passenger journey by 25% by 2030/31
Reduce traction energy per train journey by 10% by 2030/31


Cost-effectiveness
We will ensure that the total cost (operational and capital) of managing our assets (over the concession time period) is demonstrably cost effective and provides good value whilst balancing external cost pressures (such as the impact of the COVID 19 pandemic) with the need to minimise risk and maximise performance
Scenario Planning
Costs will be different for the different future states – for example, in a 're-think' future state, short term cost reductions may be more important than whole life cost. Likewise, in a 're-build' future state, whole life cost becomes more important.
We will monitor our supply chain to ensure activities are delivered cost effectively
Monitored through Engineering Periodic Reviews & KPIs
Reactive Works - on-time completion of reactive works
PPM Works - completion of planned preventative maintenance
Effective Delivery of Renewals - Planned volume/milestones of project renewals
Monitored through QX Process
Station Efficiency Plans
We will collaborate with our supply chain to plan and deliver cost-effective renewals over the concession
Captured in SASs, supported by asset deterioration modelling
Continued development of Deterioration Models - for additional assets
5YAMS Process
Delivery of Route O&M 5YAMS Net Efficiencies
NRHS - Operations / Infrastructure / Training evolution
We will set ambitious targets to deliver long-term opportunities and efficiencies, as well as mitigate key risks
R&D - trials & benefits monitoring
Cost Estimating Policy - HS1
Benchmarking of unit rates
Considerations for Condition at hand back - HS1
Lifecycle cost analysis
Achieve condition-based concession targets (TBC)
Growth
We will manage our assets to support long-term growth in capacity and revenue, taking future demand into account.
We will monitor our supply chain to manage assets so that they are fit to achieve our growth masterplan objectives
Monitored through growth objectives and St Pancras Masterplan
Monitored through the TOC first working timetable


Legal Compliance
We will comply with all legislation, HS1 consents, Historic England conditions, concession agreement, (station) leases and environmental policy commitments.
We will implement and monitor proactive assurance processes
Assurance board and audit process
Asset Management System Internal Audit (ISO)
We will monitor our supply chain to ensure compliance with all legislation, consents conditions, and commitments
Monitored through Supply Chain contractual and reporting processes
Supplier compliance KPIs (e.g. safety and asset condition)

Appendix 7: Monitoring and improvement

A7.1 Monitoring of delivery and key performance indicators (KPIs)

We monitor delivery and asset management capability through a series of key performance indicators (KPIs) as identified in Appendix 6. We have developed the KPIs for both route and stations assets, aligned to the asset management objectives.

We will continue to review these KPIs as part of the SAMP updates to esure they remain applicable.

A7.2 Vision and objectives for the AMS

Since the start of CP2, we have achieved improvements in asset management capability by improving our: leadership and culture; asset management system; asset condition data collection and analysis (including the asset criticality process); and development of specific asset strategies (SASs) by our strategic partners.

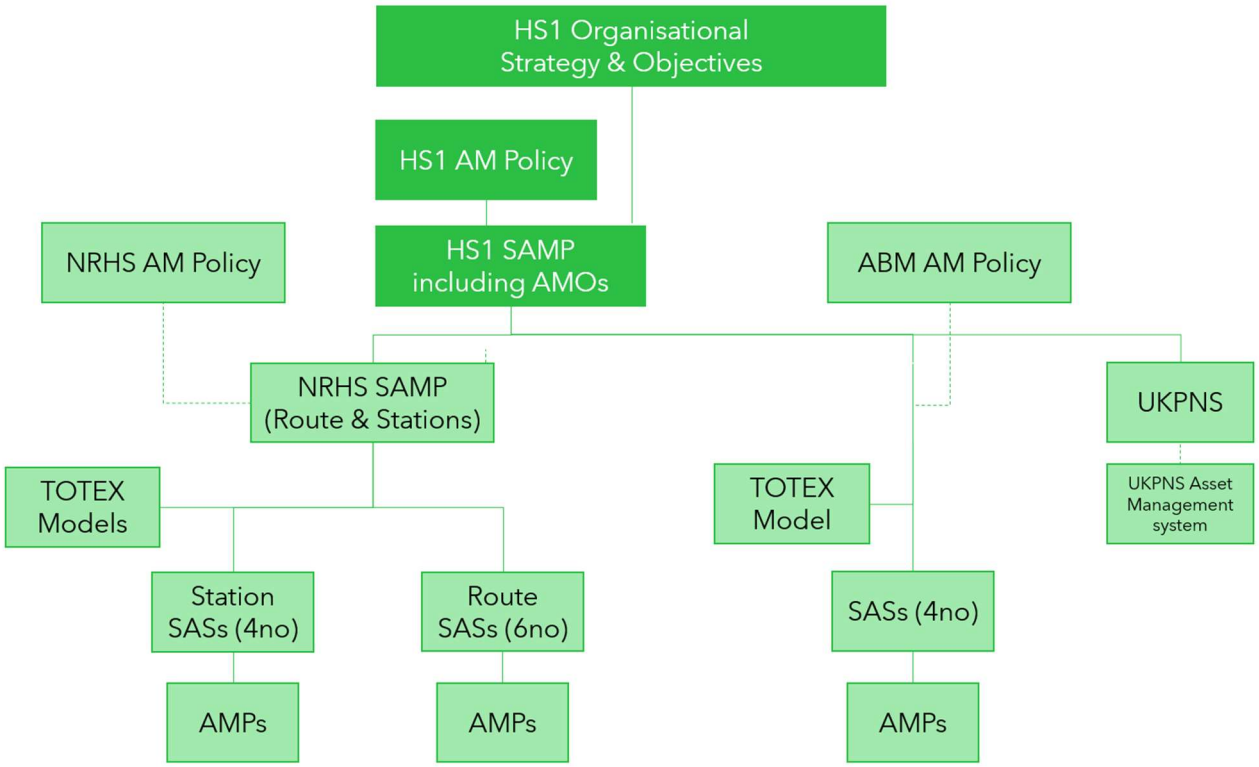
Our corporate vision needs to be underpinned by leading asset management practices. This SAMP sets out (in Appendix Section A7.5) a set of minimum capability expectations, which are aligned to good practice. We expect our partners to go beyond this minimum capability to unlock the potential value in our assets to help drive growth of the business.

The key areas of improvement for our AMS are further detailed in Appendix section A7.6.

A7.3 The HS1 asset management strategy and plans hierarchy

Our asset management strategy and plans hierarchy are illustrated in Figure 13. It contains our overarching elements that provide direction to our strategic partners' strategies and plans.

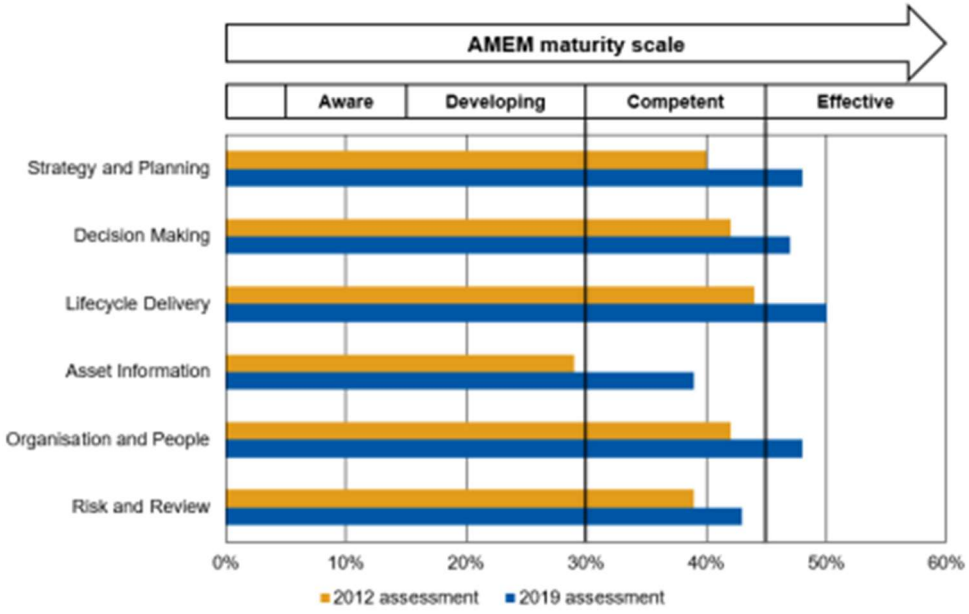
Figure 13: HS1 asset management strategy and plans hierarchy



A7.4 Current HS1 asset management capability

In 2018, we commissioned AMCL, to undertake an independent assessment of HS1 Ltd and NR(HS) competency in asset management using the Asset Management Excellence Model (AMEM) framework. The AMEM framework is used by both ORR and NRIL. AMCL found that HS1 Ltd and NR(HS) have made steady progress in the level of asset management maturity since the baseline assessment in 2012, as shown in Figure 14.

Figure 14: Asset management maturity scores



Our maturity scores have improved for all six subject groups since 2012. A maturity score of 45% is considered effective - asset management activities are fully effective and are being integrated throughout the business - and demonstrates compliance with ISO 55001. We have achieved effective scores in four of the subject groups. In the remaining two subject groups we have achieved competent maturity scores. A score of 30% to 45% is considered competent - asset management activities are developed, embedded and becoming effective.

The AMCL report included a number of high level recommendations as well as more detailed findings and opportunities for improvement. We will continue to improve asset management capability in line with other leading asset practitioners and will follow the principles of ISO 55001 asset management best practice. The key improvement activities are set out in appendix section A7.6.

A7.5 Strategic partner asset management capability

Our strategic partners have achieved or have plans to achieve ISO 55001 accreditation. This is detailed in Table 11 below. We expect our partners to achieve and continue to maintain ISO 55001 certification, signalling good practice asset management.

Table 11: Strategic partner asset management capability

Strategic partner	Asset management capability
NR(HS) Route	We have worked with NR(HS) to develop its asset management capability. NR(HS) Route obtained certification to ISO 55001 in March 2018. Facilitated by the HS1 SAMP and asset management objectives, we will continue to provide asset management direction to NR(HS).
NR(HS) Stations	NR(HS) Stations is working to achieve ISO 55001 accreditation by the end of CP3. This HS1 portfolio SAMP, with the asset management objectives, will provide direction to the development of NR(HS) Stations' asset management documentation.
ABM	ABM is ISO 55001 accredited and plans are being developed to include Ashford International Station.
UK Power Network Services	The asset management of the HS1 Distribution System was certified to ISO 55001 in December 2018 and continues to be accredited following a successful surveillance audit carried out in November 2020.

A7.6 AMS development activities

We asked our strategic partners to develop CP4 commitments which set targets to support continual development of the AMS. The table below includes the NRHS commitments which have been agreed and will be captured within their asset management plans. These commitments are also aligned to our AMOs.

Table 12: CP4 commitments

#	AMO alignment	Commitment	Milestone date
1	Performance Cost-effectiveness	NRHS to produce an asset maintenance data and information system strategy for the deployment and integration of EAMS, GIS, and BIM systems . The strategy will outline the vision for how these systems will be integrated and key milestones for implementation. The creation of the strategy will ensure that new projects and renewals to the assets and asset data help build an integrated data system (as opposed to preventing).	The strategy to be produced by April 2026

#	AMO alignment	Commitment	Milestone date
2	Cost-effectiveness Safety	NRHS to deliver the maintenance efficiencies by the end of CP4 that are declared in the NRHS 5YAMS. The efficiencies will consider (and implement where cost effective) the following new ways of working: • Trials of automated inspection and video analytics • Deploy Remote Condition Monitoring on points and switches, this may then be expanded to other assets whose failure significantly impact cost or performance. • Adopt risk based maintenance approaches to identified assets • Delivering the next phase of integrating NRHS's O and M and renewals projects planning and delivery.	By end of CP4
3	Performance Legal	NRHS to maintain ISO55001 certification across Route and Stations and our other certifications: ISO9001 (Quality), ISO14001 (Environment) and ISO45001 (Occupational Health & Safety).	Throughout CP4
4	Performance Cost-effectiveness	NRHS to continue to develop the TOTEX forecasting capability, including monetisation of risk and opportunities in accordance with NR (HS) SAMP timeframe. This information is used to inform where to apply risk based maintenance resulting in a PR29 submission that considers better the financial impact of asset failure.	Incorporate into PR29 plans
5	Performance Cost-effectiveness	NRHS to introduce objective condition scoring methodology for major asset groups (this should reflect those assets that drive 80% of the OM and R 40 year cost) within CP4. In CP4 NRHS will develop the scoring that is held in our maintenance management systems such that those working in the field on hand held devices can select an objective condition score for each asset they are inspecting. We will use the condition scoring data to improve maturity of degradation analysis for PR29 and this will be evidenced and reflected in our PR29 submission.	Incorporate into PR29 plans
6	Performance Cost-effectiveness Safety	Continue to develop the Obsolescence approach developed for PR2 by developing and implementing an obsolescence strategy that considers the financial impact of asset failure, the cost to maintain an obsolete asset, the management of spares and the cost to renew. This will result in a common set of guidelines that will drive the strategy for S and T and E and P such that the approach is common to all assets.	The strategy to be in place by April 2026
7	Performance Cost-effectiveness	HS1 and NRHS to trial the implementation of streamlined governance on minor renewals. Assessment and recommendation to be included in PR29 on whether these works should move to O&M categorisation for CP5.	Update on trial provided by end of Year 2. Assessment and decision incorporated into PR29 plans.

We are also committed to additional improvement activities in tandem with our strategic partners. Therefore we are currently developing HS1 commitments which will identify further AMS development activities.

HS1 AMO developments

The HS1 AMOs are continually reviewed and updated as part of the SAMP updates. We have identified the following updates which we will endeavour to action in future revisions:

- Undertake an exercise to review the end of concession hand back requirements and how these impact our asset management obejctives and asset management approach. The long-term output would be to update the HS1 AMOs and KPIs so that they capture any hand back requirements and monitor successful preparation and delivery of hand back.
- Asset Information Strategy – To be revised to reflect the introduction of the new eAMS and record progress against the long-term vision. The strategy should reflect the outcomes of the CP3 R&D projects and how emerging technology will be introduced to monitor assets.
- Develop additional objectives related to heritage, these can be added to the Performance – Customer Satisfaction objectives and the Legal Compliance – proactive assurance process objectives. We will work with our heritage team to develop appropriate objectives aligned to our heritage business priorities.

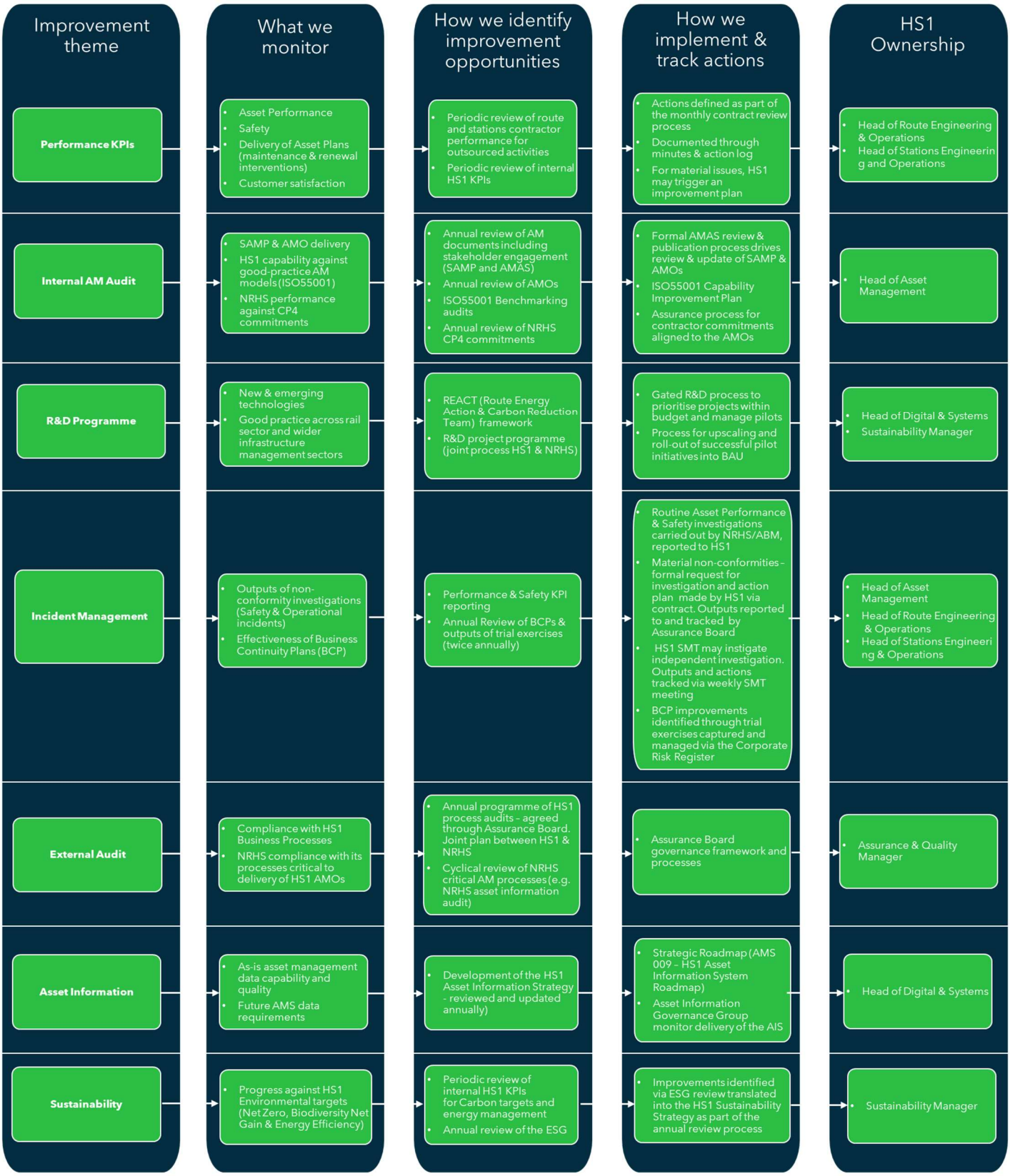
A7.7 Continuous improvement

To ensure continuous improvement within our organisation, we have developed a continuous improvement plan which is shown in Figure 15. This includes serveral key improvement themes that have been identified, and details the process for monitoring, identifying, and implementing these improvements.

Furthemore, we also engage with other high-speed railways around the world. We are a member of the European Rail Infrastructure Managers (EIM), and through this channel, we are able to liaise with others to discuss best practice asset management in the industry.

Finally, our SAMP will be reviewed regularly, with the rest of the asset management system, to ensure that it remains fit for purpose.

Figure 15: Continuous improvement plan



1. HS1 SAMP authorisation

HS1 Authorisation	Comments
On behalf of HS1 Limited, I authorise this Strategic Asset Management Plan. Name: Robert Sinclair Role: Chief Executive Officer, HS1 Limited Signature ..... Date 23/04/2024	

HS1 approval	Comments
On behalf of HS1 Limited, I approve this Strategic Asset Management Plan. Name: Richard Thorp Role: Director of Engineering and Technology, HS1 Limited Signature ..... Date 23/04/2024	

Prepared by	Comments
Name: Joanne Parkes Role: Head of Asset Management, HS1 Limited Signature ..... Date 23/04/2024	

Reviewers	Comments
This Strategic Asset Management Plan has been reviewed by representatives of the following organisations: HS1 NR(HS) ABM	

SAMP review

The SAMP will be subject to a minor review annually and a major review every 3 years.

Glossary

Acronym	Explanation
AIBA™	Asset Intensive Business Architecture
AMAS	Asset Management Annual Statement
AMO	Asset Management Objectives
AMP	Asset Management Plan
AMS	Asset Management System
CA	Concession Agreement
CDE	Common Data Environment
CP	Control Period
BCIS	Building Cost Information Service of Royal Institute of Chartered Surveyors
CCTV	Closed-circuit Television
CIS	Customer Information System
DfT	Department for Transport
eAMS	Enterprise Asset Management System
HS1	High Speed 1
ISO	International Standards Organisation
LTC	Long Term Charge
NR(HS)	Network Rail High Speed Ltd.
NRIL	Network Rail Infrastructure Ltd.v
NRPS	National Rail Passenger Survey
ORR	Office of Rail and Road
QX	Qualifying Expenditure
RACI	Responsible Accountable Consulted Informed
SAIIP	Stations Asset Information Improvement Programme
SAMP	Strategic Asset Management Plan
SAS	Specific Asset Strategy
SCA	Stations Concession Agreement
SoS	Secretary of State
WLC	Whole Life Cost

HS1 Strategic Asset Management Plan (SAMP)