

HS1 Ltd

Stations Long Term Charge Review for Control Period 3

Submission to DfT

31 May 2019

Foreword

HS1 is the UK's only high speed railway and provides a direct rail link into Europe. Our success requires our customers to perform in well in their businesses and we know we have a significant role to play in supporting their ongoing growth and development.

Central to our customers' success is continuing to provide outstanding stations to start or finish passenger journeys with safe and efficient passage and world-class amenity.

Our approach is to develop strategic partnerships and be an intelligent client – thus ensuring we continually add value to the concession we hand back to Government in 2040. We are not complacent and will always seek to challenge our suppliers and deliver efficiently for our customers.

Throughout CP1 and CP2 we have consistently provided excellent station infrastructure availability and maintained one of the UK's highest customer satisfaction levels at our stations as measured through the National Rail Passenger Survey.

Our train operator customers have told us that they continue to expect better from HS1 in CP3 at a lower cost while providing them with the opportunity and incentive to grow their businesses. As a strategic partner and intelligent client, we will:

- Continue to work with Network Rail (High Speed) who operate and maintain HS1 on our behalf in CP3. We will challenge NR(HS) to outperform its current plans for efficiencies over the next five years;
- Review our major contracts where we pass costs through to customers. For stations this will largely be addressed through the Qualifying Expenditure (Qx) process; and
- Build on the improvements to asset management we have delivered during CP2 to inform decision-making in CP3 and beyond.

During the periodic review we have worked closely with stakeholders as an honest broker. We have clearly identified the risks and opportunities we collectively face and adopted a 'no surprises' approach. Stakeholders have told us that they value our proactive and collaborative approach.

This document sets out the work undertaken and the feedback received. This includes:

- The input from stakeholders that, along with our asset stewardship duties, set the outputs we need to deliver;
- Our approach to asset management, and the asset management system that we have developed;
- Our review of the renewal frequencies and unit costs, which generate our 40 year forecast of costs; and
- How we have allocated the costs between operators at stations.

We look forward to working with customers, suppliers and stakeholders throughout 2019 as we finalise the review with DfT, and as we continue to deliver an outstanding high speed railway over the five years from 2020.

Dyan Crowther

Chief Executive Officer

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1. Executive Summary

The success of HS1 is clear – a doubling of passengers to and from Kent, and 15% passenger growth for European travel since the Concession started in 2010. All of these passengers have benefited from substantial journey time reductions – over 30 minutes for international passengers, and more than 40 minutes for domestic passengers travelling from Ashford or beyond.

The HS1 international stations have been a key part of this – enabling a 40% increase in capacity for journeys into London. This is not just the renovation of St Pancras International and the amenities it provides for passengers; but also the new stations at Stratford International with its connectivity, Ebbsfleet International providing commuter excellence, and connections into Europe from Ashford International.

Stations are often described as the gateway to railway journeys. They are very much so for HS1. Stations planning is key to delivering the world-class railway experience we aim for. Our vision for stations includes delivering outstanding amenity that makes the start or finish of a passenger journey a delight. Passengers should pass safely and efficiently through each of our stations aided by outstanding availability of key assets underpinned by an appropriate asset management regime delivering minimum whole-life costs. They should deal with excellent staff throughout the journey.

This review is undertaken in the context of a successful CP2. Our stations have performed well: safety for the workforce and passengers has improved, and passenger satisfaction has been outstanding. We have delivered against our commitments, including:

- Outstanding feedback from passengers via the National Rail Passenger Survey (NRPS) and our own survey Station Matters about the amenity and station experiences that we provide. We have worked hard to maintain these scores against rising expectations and while facilitating substantial growth.
- Critical asset availability has been extremely high, over 99% on average across the stations.
- Safety has improved (passenger accidents at stations have reduced 38% since 2012 and workforce accidents reduced by 26% over the same period).
- Our planned CP2 spend has been in line with what we forecast. We have improved our procurement and project management capabilities.
- Despite the limitations of the supplier contracts we inherited with the concession, we have worked hard with NR(HS) and its suppliers to provide a firm base for further improvements in CP3 and beyond.
- Retendered the stations contract at Ashford International securing cost savings and improved performance.

We need to do even more to keep delivering for passengers in future given multiple challenges:

- An ageing asset;
- Strong, and continued growth in station usage;
- Increased expectations; and
- Pressures on costs.

Our plans reflect a strong engineering review of the approach set out in our previous periodic review (PR14), alongside an independent check of our costing approach. We have done this in line with our asset stewardship obligations – and good asset management practice – to take a sustainable whole-life cost approach.

The charges paid by operators at each station are built up from a 40-year forecast of cost, which is then smoothed into an annual annuity, and finally converted into the share attributable to each operator.

The following table sets out the total annual annuity at each of the four stations in 2018/19 prices. It shows an overall £5.1m p.a. (79%) increase between CP2 and CP3.

Station	CP2 LTC	Removal of CP2 efficiency uplift	Other changes between CP2 and CP3	CP3 LTC
St Pancras	4.282	+0.771	+2.559	7.612
Stratford	0.770	+0.101	+0.687	1.558
Ebbsfleet	0.731	+0.191	+0.737	1.659
Ashford	0.763	+0.102	+0.001	0.866
Total	6.545	+1.165	+3.985	11.695

The increase is due to three main factors:

- Increased frequency of interventions for lifts, escalators and travelators, which is one of the largest categories of renewal spend. This is driven in part by the observed degradation in asset condition which has been greater than expected – the assets in place were designed for 'inside' operation but the level of moisture in the air is more equivalent to 'outside' conditions. It is also driven by the work we have done with operators around operational criticality, identifying that these assets are key to the passenger experience and cannot be out of service for any extended period;
- Removal of the 0.6% p.a. compounding 'efficiency overlay' that was applied to unit costs in the PR14 numbers. While we recognise the need to stretch ourselves and chase efficiency improvements, there is limited evidence to support such an overlay that reduces the 40-year budget by approximately 25%; and
- Application of an appropriate risk and contingency allowance, reflecting the uncertainty associated with the cost of the renewals programme over a 40-year time horizon. Since publishing our stakeholder consultation, we have worked with our independent cost consultants to estimate the appropriate level of risk and contingency to be applied to stations renewals costs.

Clearly an increase in cost of itself is a challenge for operator affordability. Our proposals are to deliver the best overall solution, where other factors such as asset availability / reliability, passenger amenity, and long-term cost optimisation are weighted more highly than short-term cost reductions. We have a number of initiatives underway to deliver appropriate cost discipline now and into the future. These include:

- Improved project governance and delivery. As with route, we have introduced a project management process with stage-gate controls that underpins the ultimate approval of renewal spend from the escrow accounts by ORR and DfT.
- Enhanced asset management approach. We have invested in putting an asset management system in place. This is the start of the journey and we have a lot more work to do. Our objective is to concentrate spending on critical assets, and to further investigate the trade-offs between maintenance and renewal spend, despite these two activities being covered by separate processes (Qx and LTC, respectively).
- Driving ongoing improvement plans with suppliers. We successfully retendered station management at Ashford International. We have limited formal opportunity to amend the contract with NR(HS) covering the other three international stations that we inherited at the start of our concession but we have driven staff, structural and process change to benefit operators. Our strategic client approach to ongoing collaboration will continue during CP3.

PR19 has focused on the following to deliver a better basis for future decision-making:

- Investment in the asset management system. We have started by aligning the documentation and approach to ISO55001 principles as this provides a robust basis for decision-making. We are very much at the first stage. The benefits in terms of whole-life-cost decision-making will be seen in future Control Periods.
- Amending the asset hierarchy to make it a more rational basis for predicting / monitoring renewal spend, while still mapping to the necessarily more detailed hierarchy in place for operations and maintenance activity.
- An independent review of the key building blocks of the renewal calculation: asset lives and associated degradation rates, direct unit costs, volumes, and on-cost assumptions.

- Developing plans for future enhancement of arrangements with NR(HS) and Mitie to deliver benefits to operators.
- As an important corollary, starting the process to collect information for the future, by understanding the metrics that best explain degradation, and by identifying the most critical assets.
- Implementing a framework to facilitate enhancements at stations, which is key to delivering the forecast growth, and making sure the stations remain relevant to customer needs and wants.

Asset management excellence is a long-term process, requiring step-by-step improvements that transcend the five year Control Periods. We have a number of ongoing workstreams to deliver improved maturity and better decision-making:

- Fully integrating the station masterplanning work with the asset management process, and extending masterplanning to all stations.
- Using the tools and techniques we are putting in place to make better whole-life-cost decisions, including the linkage of renewals and maintenance spend.
- Continuing to work with NR(HS) to improve the delivery of renewals schemes in an efficient manner. This includes ongoing improvements in the contractual framework between HS1 Ltd and NR(HS).
- While it is outwith this regulatory review, the improvement programme for Qx is underway separately as part of the best estimates process. This is clearly important for operators as the total charges for stations comprise Qx and LTC.

As with route, the improvements to our planning and thinking are supported by our behaviours and commitment to customer engagement. We have developed initiatives to facilitate this in future, such as the 6-monthly Strategic Partnership meetings between CEOs.

About this submission

We have consulted closely with stakeholders since mid-2017 through a range of workshops culminating in a formal consultation earlier in 2019. The consultation was an extremely important part of our regulatory process. We aimed to:

- Make sure stakeholders understand the work that we have done and the engineering logic that we have applied;
- Reassure parties that we are motivated to achieve efficiencies and that we have the workstreams in place to deliver them. This is true not just of this LTC review, but also the separate Qualifying Expenditure (Qx) process; and
- Check that we are best meeting the trade-offs between long-term asset availability and condition, performance delivery for customers, and value for money.

Stakeholder feedback has been invaluable. In key sections of the document we have summarised feedback we have received and identified areas in the document that have been updated.

We received seven responses to our consultation from the following organisations (five of which were relevant to stations):

- Eurostar International Limited (EIL) (provisional response on 10 April followed by a fuller response on 17 May);
- London & South Eastern Railway Limited (LSER);
- Department for Transport (DfT);
- Transport for London (TfL);
- Kent County Council (KCC);
- DB Cargo; and
- Rail Freight Group (RFG).

The clear feedback from stakeholders was that in managing the trade-offs between long-term asset availability and condition, performance and value for money the current approach to pre-funding renewals is financially challenging. We have therefore set out a number of options for DfT to consider. We note however that our approach to the stewardship of the assets in the long term is set out in our Concession Agreement and the HS1 Lease with the DfT. We would expect assurance from DfT that any move away from the current approach to long term asset renewals was consistent with those agreements.

DfT has granted EIL until mid-June to fully respond to our consultation. As noted above, we received a provisional response from EIL by our

consultation deadline of 10 April and a fuller response on 17 May. This submission takes into account the points raised in EIL's provisional response and, where time has permitted, we have provided an initial response to some of EIL's concerns from its 17 May response. We will formally respond to DfT in relation to EIL's full response after the mid-June deadline set by DfT.

The main changes we have made between our Stations LTC Review consultation document and this submission are as follows:

- **Section 9 Renewals activities and costs:** includes stakeholder responses to our consultation;
- **Section 10 Long Term Charge:** has been updated to (i) reflect the inclusion of risk and contingency in the LTC calculation, (ii) present alternative options for the renewals annuity and the charges associated with these options, and (iii) include stakeholder responses to our consultation
- **Appendix 3 Consultation responses:** we have added a summary table of consultation responses.

We can provide a redline copy showing all changes between the draft Stations LTC Review for consultation and this submission to stakeholders on request.

1.1. Structure of this consultation document

The remainder of this document is as follows:

- Section 2 sets out our vision, summarises the characteristics of each of the stations and the contractual framework governing station management;
- Section 3 outlines the scope of the periodic review process and how we put this plan together;
- Section 4 outlines the overall excellent performance at stations during CP2.
- Section 5 provides an overview of how we have put the plans together, and the different methodological elements.
- Section 6 describes the outputs for CP3, drawing on the Asset Management Objectives which are a key building block of our asset management system.
- Section 7 covers our approach to stations safety and security, and our plans for continuous improvement in this critical area.
- Section 8 highlights our asset management approach, how we best meet the challenge of the trade-offs between asset performance and availability over time, asset condition, and costs that are value for money to customers.
- Section 9 sets out the cost of the identified renewal works over the 40 year forecast period, and the work we have done to benchmark those costs. It also describes the processes and frameworks we have in place to deliver any renewals efficiently.
- Section 10 calculates the charges themselves – how we allocate the costs at each station between the operators.
- Section 11 covers a number of regulatory framework issues, including our proposed approach to facilitating station enhancements.
- Section 12 sets out some concluding remarks and next steps.

To assist DfT in its consideration of this submission, we have provided a summary table of stakeholder feedback received and our responses to this feedback in Appendix 3. In certain areas of the document we have prepared a summary of the feedback received and highlighted our response or potential options DfT could consider as it comes to its determination for CP3.

Part 1: Context & Approach

2. HS1 stations

2.1. Our vision and our journey

Our stations are the gateway to the high-speed services operating on HS1. The right environment at the start and end of passenger journeys is critical to our operators' success and how their passengers feel about their journeys. For stations this particularly means:

- Safe and secure passage through the station;
- Efficient passage guided by clear information and facilitated by critical assets that are available when required. This includes connectivity to local amenities and other transport modes;
- Provision of sufficient capacity to cater for forecast growth, and well-drilled response in times of perturbation;
- Future-proofing services through innovative responses to changing circumstances;
- Outstanding amenity so that the end-to-end high-speed experience is seamless and a delight; and
- Overall value-for money through minimum whole-life cost.

We deliver this vision through a combination of our approach to renewals – the subject of this document – as well as operations and maintenance per the plans set out in the separate Qualifying Expenditure (Qx) best estimates process.

Our vision for HS1, integrated across our route and stations assets, is ***"to deliver the world's leading high speed rail experience"***.

HS1 has evolved over time, from a concept to a construction project to a fully operational railway. In CP2 we have delivered outstanding performance and significant improvements in cost efficiency. To deliver our vision, we will continue to evolve through CP3 and beyond to respond to the challenges of an ageing asset and a changing environment including strong passenger growth. At each stage in the HS1 journey, we will ensure that we have the right skills and knowledge to achieve the right outcomes. Our journey is summarised in Figure 1.

Figure 1: The HS1 journey

Our station assets are performing well, but there is more we need to do to meet future challenges, and to achieve even greater benefit for operators. During CP3 we will:

- Building on work to-date including the development of an asset management system, **enhance our asset management approach** so that we make better decisions. This includes collecting the right information, improving our understanding of degradation rates and failure modes, and the trade-offs between renewal and maintenance spend to inform optionality analysis.
- Evolve the **supply chain** arrangements to improve incentives and provide a robust structure for delivering for operators.
- **Develop masterplanning** arrangements at all stations, and link specific passenger flows to impact on specific assets so that we reflect this in our modelling.

- Continue to work with operators to make sure we have the right mix of working-level and strategic interaction so that we are **responsive to customer needs** and facilitate the discussions necessary for good decision-making.

2.2. Our stations

We have four unique stations with their own challenges. Our plans need to reflect the different nature and purpose of each of the stations.

2.2.1. St Pancras International

St Pancras International, HS1's London terminus, is a Grade I listed building. Originally opened in 1868, the station was refurbished and opened as an international terminal in 2007. St Pancras International is significantly different from our other stations in terms of heritage, size, operation and expenditure levels - which are greater than the other three stations combined.

The station has a total of 13 platforms: six for high speed international services, three for high speed domestic services from Kent and four for domestic services on the classic network provided by the East Midlands franchise. It has areas for international departures, arrivals and customs, ticket offices, 108,000 square feet of retail space and a 324 space car park. The station welcomes over 50 million visitors each year.

St Pancras International enjoys excellent connectivity via King's Cross St Pancras, London Underground's busiest station, served by six underground lines, and through its proximity to King's Cross and Euston stations.

St Pancras International and neighbouring King's Cross station have been a major catalyst in the 67 acre urban regeneration scheme to the north of the two stations. By completion in 2020, the area will have 1,900 new homes and three million square feet of office space.

There is a sub-surface Thameslink station underneath St Pancras International which is leased to NRIL. The Thameslink station, London Underground's ticket halls and St Pancras Chambers do not form part of the HS1 Lease and are outside the scope of this review. The sub-surface Thameslink station in particular is important context for this review as changes to Thameslink services mean a significant increase in passengers using St Pancras International.

2.2.2. Stratford International

Stratford International was built in 2007 and played a major role in the 2012 Olympics, given its proximity to the Queen Elizabeth Olympic Park. It remains a transport hub with excellent connectivity. As well as Westfield Stratford City shopping centre it provides easy access to the financial hub of Canary Wharf. It is currently used by Southeastern High Speed domestic services which commenced operating in 2009.

The station is served by Docklands Light Railway (DLR) and is a short walk from Stratford station, a major interchange, with services on London Underground, London Overground, Crossrail, National Rail and DLR.

The station has four high speed platforms: two for use by domestic services and two for use by international services (currently there are no international services from Stratford). These are located below ground level and are reached by escalators, stairs and lifts. The station has 3,300 square feet of retail space and a car park with 840 spaces.

2.2.3. Ebbsfleet International

Ebbsfleet International, in north Kent, is at the heart of a major regeneration area and provides a predominantly park and ride commuter facility for those travelling to and from London for work or leisure. Up to 15,000 new homes, 5.5 million square feet of commercial space and two million square feet of retail, leisure and community facilities are scheduled to be built in Ebbsfleet Garden City over the next 15 years.

The station opened in December 2007. Station design and architecture is similar to Stratford International. Ebbsfleet International is a park and ride station with over 5,000 parking spaces and connections to the major road network (M25, M20, M2 and A2) giving it a wide catchment area.

The station has six high speed platforms, two for international services and four for domestic services. Two of the domestic platforms connect to the North Kent Line on the classic network.

2.2.4. Ashford International

Ashford International is located in the growing commuter town of Ashford in east Kent. The station is made up of two distinct sections: one serving international passengers and the other serving domestic passengers. The domestic section of the station is owned by NRIL and operated by LSER while HS1 Ltd leases the international section and car park.

The international section of the station opened in 1996. It has two high speed international platforms, 3,500 square feet of retail space and 1,800 car parking spaces.

Ashford International's asset base is older than those of the other HS1 stations. The station has had significant renewals activity during CP2 which have been carried out with minimal impact on the operational station; the most significant have been the renewals of the lifts and the heating system.

2.3. Contractual framework

2.3.1. Regulatory

Our interest in the lands and rights required for the operation and maintenance of HS1 is conferred under four leases with the Secretary of State for Transport (SoS):

- the HS1 Lease which includes all the HS1 track, the stations (excluding Ashford International) and Temple Mills depot;
- the HS1 Underlease for Ebbsfleet International station forecourt and car parks;
- the underlease of Ashford International Station; and
- the underlease of the island platforms at Ashford International station.

The leases covering St Pancras International, Ebbsfleet International and Stratford International are for the same term as the Concession Agreement (to 31 December 2040) and the leases covering Ashford International currently run to 2028 with an option for the SoS to extend.

Under the HS1 Lease, we have a number of asset stewardship obligations, including keeping the stations in "good and substantial repair" at all times during the concession, including on handback to the government at the end of the concession.

The HS1 Lease also sets out the provisions governing the Periodic Review of the Long Term Charges – of which this consultation document forms part.

2.3.2. Supply chain

We have long-term asset stewardship obligations for the HS1 stations. We operate through an outsourced model, in which we lead the supply chain as a strategic partner and intelligent client. We have a good understanding of our asset and our requirements, we challenge our suppliers to improve their practices and deliver efficiently.

NR(HS), a wholly-owned subsidiary of NRIL, operates, maintains and renews St Pancras International, Stratford International and Ebbsfleet International stations on our behalf. Our relationship with NR(HS) is governed by a Station Concession Agreement which commenced before the start of the HS1 Concession and expires in 2086.

Our relationship with NR(HS) for stations is separate to our relationship for route operations, maintenance and renewal. Under the Station Concession Agreement, NR(HS):

- Holds the safety authorisation as the Station Facilities Operator;
- Delivers the Services, discharging the obligations of HS1 under the Station Access Conditions;
- Is reimbursed for the cost of supplying the Services; and
- Must provide an outline repair programme.

There is no formal scope to terminate or change the terms of the Station Concession Agreement. However, we have worked positively and collaboratively with NR(HS) during CP2 to clarify roles and responsibilities.

We will continue to work with NR(HS) and other suppliers to deliver better outcomes for our customers and their customers in turn.

Mitie operates, maintains and renews Ashford International station on our behalf. Our relationship with Mitie is governed by a Station Management Agreement. Mitie was appointed following a competitive tender in 2013 with a contract to March 2018. The contract term has been extended for a further three years to March 2021.

The role of Mitie at Ashford International is different to that of NR(HS) at the other HS1 stations. NR(HS) is responsible for asset management and railway operations at the stations whereas Mitie is responsible only for asset management at Ashford International with EIL responsible for railway operations.

2.3.3. Customers

Train operators enter into Station Access Agreements which define the rights, charging mechanisms and obligations for use of HS1 stations. The Station Access Agreements are based on ORR model forms and incorporate a standard set of conditions but are not subject to ORR approval. The train operators with Station Access Agreements at each station are:

Station	EIL	LSER	EMT	GTR *
St Pancras International	✓	✓	✓	✓
Stratford International		✓		
Ebbsfleet International	✓	✓		
Ashford International	✓			

** The Station Access Agreement with Govia Thameslink Railway (GTR) relates to diversionary access only.*

Station access charges are set separately for each of the four HS1 stations and consist of qualifying expenditure (Qx) and long term charge (LTC). Qx is designed to recover the cost of operations, maintenance and repair expenditure and LTC is designed to recover the cost of station renewals.

3. Periodic Review process

3.1. Purpose

Under the HS1 Lease, DfT undertakes five-yearly reviews relating to station renewals. This review covers the period from 1 April 2020 to 31 March 2025, Control Period 3 (CP3). DfT published its Approach to HS1 Stations Periodic Review in February 2018.

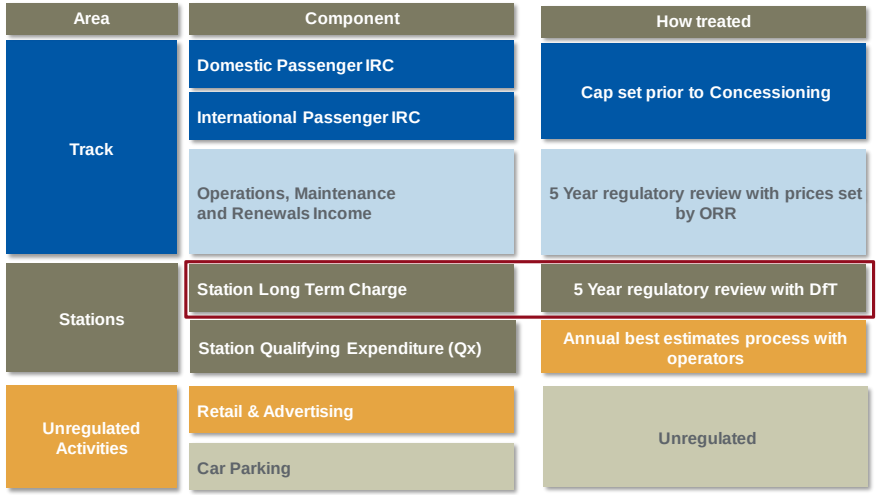
The HS1 Lease and the Station Access Conditions (SAC) set out a number of requirements that this review must satisfy. The summary requirement is that we ensure each station remains in "good and substantial repair and condition during the whole of the Life Cycle Period". We take this to refer to the capability of the asset as a whole rather than the age of specific components. This requirement demands a long term outlook, with 50 year asset management oversight of all four stations from 2010. This CP3 review therefore covers the 40 years from 2020 to 2060.

3.2. Scope of the review

The periodic review covers the costs of renewal of the HS1 stations and how these costs are recovered from train operators via the LTC. It **excludes** important elements of our business:

- Investment Recovery Charge (IRC), a track access charge which is capped at a rate set out in the Concession Agreement.
- Route operation, maintenance, repair and renewal activities, which are regulated by ORR and covered by a separate periodic review process.
- Station qualifying expenditure (Qx), designed to recover the cost of operations and maintenance expenditure at stations. Qx is agreed with TOCs through the separate annual 'best estimate' process.
- Other unregulated commercial activities such as the letting of retail space and car parking facilities.

Figure 2: Our income streams and their regulatory treatment



As there are a large number of products for this periodic review submission, this Stations LTC Review document is intended to be a summary that outlines the basis of our plans and where stakeholders can find additional detail. The full suite of underlying documents is set out below. These are a combination of the products we are obliged to produce under the requirements in the HS1 Lease, as well as those we produce as part of our commitment to best practice and adopting asset management in line with the requirements of ISO 55001. We have provided the full suite to DfT and its advisors; and provided this Stations LTC Review and the accompanying Strategic Asset Management Plan (SAMP) to other stakeholders:

- **Stations LTC Review**: this covering document that sets out a summary of all of the work we have done along with the main narrative.
- **Strategic Asset Management Plan**: delivered as part of the overall Asset Management System. Sets out methodologies for how the asset management system will deliver the asset management objectives, including the relative importance of each asset group or system

- **Specific Asset Strategies**: one document for each asset discipline, in line with overall asset hierarchy (i.e. six categories). How the methodologies have been applied for a specific asset class, linking together the intervention plans (operation, inspection, maintenance, renewal).
- **Station Life Cycle Reports (LCRs)**: documents that meet the defined reporting requirements of each HS1 Station Lease covering current performance, charges, plans and HS1 "asset stewardship".
- **Life Cycle Cost (LCC) models**: the spreadsheets that allow us to build up the forecast of cost over the 40-year period. Taking the volumes of renewals required by the asset management documents, these spreadsheets set out each asset category, the frequency of renewal, the direct unit costs, and the associated on-costs. This generates spend per asset per annum which can be totalled over the forecast period.
- **Long Term Charge Model**: The spreadsheet that converts the LCCs into the charges paid by each operator for each individual station. First it calculates an annuity from the 40 year forecast of costs, then it allocates this between the operators according to our charging methodology set out in the Station Access Conditions.

3.3. How we put this plan together

3.3.1. Stakeholder consultation

In our approach to CP3 our intent was to be:

- Open and transparent;
- Genuinely engaged with stakeholders;
- Committed to long-term success; and
- Dynamic and innovative.

We commenced with a series of bilateral meetings with stakeholders in spring 2017 to better understand their key focus areas and aspirations. Between June 2017 and December 2018, we held a series of quarterly stakeholder workshops to get stakeholder input to help shape our route and stations periodic review submissions. These workshops followed an 'issues based' approach structured around six themes, covering both route and stations, which reflected the main questions and subject areas that we need to address to deliver a successful CP3 plan:

- Future Railway;
- 40-year renewals plan;
- Asset management;
- Value for money;
- Regulatory framework; and
- Operational and safety excellence.

Particular station review topics covered include:

- Asset Management Objectives, and the weightings given to each of the individual categories;
- Our approach to the asset management system; and
- Approach to the review of renewal interventions / volumes, along with emerging cost implications.

We have also engaged with DfT and its advisers (GHD) to provide some progressive assurance for the regulatory decisions. Asset management sessions to engage with DfT on the technical content of our submission are summarised in Table 1.

Table 1: Asset management progressive assurance

Month	Theme
Sep-18 Oct-18	Asset Management strategic context
Nov-18	Engineering and strategic decision making Intervention volumes CP3 costing
Dec-18	Long term cost and deliverability
Jan-19	How we have made changes to meet customer expectations

We recognise that discussion at the quarterly PR19 stakeholder workshops focussed on route considerations, so the Stations LTC Review consultation document was a key part of engaging on specific station proposals.

3.3.2. Workstreams

In undertaking this periodic review, we took a targeted approach, making appropriate and efficient use of resources to address the key challenges. The models and forecasts from the CP2 process are working well, the assets are in good condition and the forecast spend is significantly lower than expected with route assets. We therefore refreshed and recalibrated our analysis for this periodic review rather than completely changing our approach.

The ultimate product of the review is the charges to be paid by each operator at each of the four HS1 stations. The charges are built up by first identifying the renewal volumes required to meet our asset obligations, then costing these interventions and finally allocating these costs between operators. Key components of our analysis for this LTC review are:

- Further development of our asset management system and alignment with ISO 55000. In particular, we have developed Specific Asset Strategies (SASs); these describe HS1 station asset management "as is" and influence, rather than provide direct inputs into, the Life Cycle Cost modelling. They provide a robust basis for future development of the SASs during CP3.
- Life Cycle Costs (LCC) modelling. We have reviewed and updated the LCC approach set out in PR14 in the following ways:
    - We reviewed asset lives, unit costs and on-costs and updated them where necessary;
    - We rationalised the model hierarchy, revising the model from component level to system level which will simplify the process of managing renewals for DfT and HS1 Ltd; and
    - As part of the LCC model review, both the direct unit costs and the assumptions around on-costs were benchmarked against similar projects. We have also established a high-level framework to guide future benchmarking activity around station costs as a whole.
    - We reviewed the appropriate level of risk and contingency to be applied to stations renewals costs
- The LTC model calculates the renewals annuity from the life cycle costs. We used the same LTC model as for CP2 with updated life cycle costs and financial assumptions.
- Regulatory framework review, in particular proposals around implementing a stations enhancements framework which is needed to cater for future growth and changing passenger expectations.

4. CP2 outturn

4.1. Overview & context

It is primarily important that we have delivered during CP2 because it underpins customer success. It is also crucial because it forms the starting point for CP3. This section highlights the good performance we have achieved during CP2 in the areas of safety, operational performance and renewals.

4.2. Safety performance

During CP2 we have maintained our excellent safety record for staff, contractors and members of the public at all four HS1 stations.

Our safety vision is "*to create and lead a culture in which all HS1 Ltd stakeholders can deliver world class safety performance with zero harm to their people, their contractors, their customers and their neighbours*".

At St Pancras International, Stratford International and Ebbsfleet International, NR(HS) monitors route and stations safety performance against 20 proactive and reactive safety KPIs. At Ashford International, Mitie reports accidents to members of the public, accidents and FWI for workforce and contractors and near-miss incidents.

The top level safety measures are:

- The Fatalities and Weighted Injuries rate (FWI) for staff and contractors. To calculate the FWI rate, incidents at stations are weighted by severity and normalised per million hours worked.
- Accidents to members of the public:
    - At our busiest stations (St Pancras International and Stratford International), the public accident rate per 100,000 footfall;
    - At Ebbsfleet International and Ashford International the total number of public accidents.

Table 2 summarises workforce and public safety performance at our stations in CP2.

Table 2: Summary of station safety performance in CP2

Measure	Performance	Comment
Workforce safety – St Pancras, Stratford and Ebbsfleet	FWI per million hours worked 2015/16 0.025 2016/17 0.279 2017/18 0.043 2018/19 0.036	Excellent safety record in CP2 to date ▪ St Pancras - one contractor RIDDOR ▪ Stratford and Ebbsfleet - no RIDDORs
Workforce safety – Ashford	FWI per million hours worked 2015/16 0.00 2016/17 0.06 2017/18 0.00 2018/19 0.14	Excellent safety record in CP2 to date.
Public safety – St Pancras	Accident rate (per 100,000 footfall) 2015/16 0.06 2016/17 0.07 2017/18 0.05 2018/19 0.08	Very good performance, meeting targets of 0.12 in 2015/16 and 2016/17 and 0.08 in 2017/18 and 2018/19.
Public safety – Stratford	Accident rate (per 100,000 footfall) 2015/16 0.01 2016/17 0.01 2017/18 0.02 2018/19 0.03	Very good performance, meeting targets of 0.04 in 2015/16 and 2016/17 and 0.03 in 2017/18 and 2018/19.
Public safety – Ebbsfleet	Number of public accidents 2015/16 6 2016/17 6 2017/18 15 2018/19 12	Very good performance.

Measure	Performance	Comment
Public safety - Ashford	Number of public accidents 2015/16 7 2016/17 3 2017/18 7 2018/19 2	Very good performance.

Table 3 shows the number of staff and contractor accidents by severity for the first four years of CP2. There has been a single RIDDOR-reportable specified injury in CP2 to date; in P4 2016/17 a contractor sustained a broken collarbone as a result of a fall. A Lessons Learned briefing was issued on this accident.

Table 3: Number of workforce accidents by severity (all four stations)

	Fatality	Specified injury	RIDDOR lost time	Non-RIDDOR	Total
2015/16	0	0	0	11	11
2016/17	0	1	0	21	22
2017/18	0	0	0	19	19
2018/19	0	0	3	19	22

There have been no RIDDOR-reportable accidents to members of the public in CP2. The majority of public accidents are related to slips, trips and falls. Our main actions to address these are:

- Implementing our successful project to reduce escalator accidents at St Pancras International at the other HS1 stations; and
- Rolling out the NRIL national campaign to reduce slips, trips and falls at HS1 stations.

In CP1, HS1 Ltd and NR(HS) focused mainly on the delivery of situational safety (what the organisation does for safety) through the development and implementation of procedures, standards and competencies. In CP2 we broadened our scope to focus on safety culture - changing the psychological and behavioural approach taken to safety by staff - through proactive and positive leadership, benchmarking, sustained planned and coordinated activities (safety workshops, employee engagement, and weekly conversations). The ORR Railway Management Maturity Model (RM3) has been used as a tool to assess the NR(HS) safety culture and identify areas for improvement.

In CP2 a fundamental review of the NR(HS) Safety Risk Model and its contributing precursors was also undertaken in order to embed risk management further into the organisation. The identification and monitoring of hazardous event precursors is used to manage risk proactively through effective risk control measures. This includes investigation of and learning from 'near miss' incidents – events where, under slightly different circumstances, harm could have resulted. NR(HS) has weekly reviews of 'near miss' incidents and shares learning throughout the workforce, including contractors.

We believe in the importance of providing proactive support to safety management on the HS1 route and stations. Wherever possible, we hold joint problem-solving exercises between affected parties.

During CP2, ORR has undertaken a number of proactive inspections and supervision activities with NR(HS). In ORR's approach to PR19 document, ORR noted that these "*revealed a proactive attitude towards predicting defects and anticipating potential problems. As a result, we have no current concerns over the safety of the network.*"

Section 7 sets out our safety strategy for the remainder of CP2 and CP3.

4.3. Operational performance

This section summarises station operational performance during CP2 Overall asset performance is strong:

- Performance is measured for service provision at a system level, not on an individual asset level;
- Individual assets can trigger performance payments, but overall performance can still be better than target;

- Changes in supplier contracts have improved asset performance; and
- Station cleaning is measured and averaged across the stations and has improved due to NR(HS) management intervention.

Key measures of operational performance are shown in the table below.

Table 4: Station operational performance measures

Measure	Performance
Asset availability	Index covering lifts/escalators, station data network, passenger information systems and other assets
Cleanliness	Cleaning audit score
Passenger satisfaction	National Rail Passenger Survey (NRPS) score for overall satisfaction with the station (St Pancras International only)

4.3.1. St Pancras International

Table 5: St Pancras International operational performance

Measure	Performance	Comment
Asset availability	2015/16 99.71% 2016/17 99.90% 2017/18 99.73% 2018/19 97.42%	Target of 97.18% achieved consistently across CP2
Cleanliness	2015/16 98.22% 2016/17 96.90% 2017/18 96.80% 2018/19 95.50%	Target of 95% achieved consistently across CP2
Passenger satisfaction	NRPS score (Autumn 2018)	Second-highest scoring station with 93.6% overall satisfaction with the station

St Pancras International has been the highest ranking UK major station in terms of customer satisfaction in 11 of the last 17 National Rail Passenger Survey (NRPS) waves. In the Spring 2018 NRPS, St Pancras was the highest scoring major station with 94% overall satisfaction with the station compared with an average for the other major stations of 85%.

4.3.2. Stratford International

Table 6: Stratford International operational performance

Measure	Performance	Comment
Asset availability	2015/16 99.65% 2016/17 99.87% 2017/18 99.14% 2018/19 99.18%	Target of 95.49% achieved consistently across CP2.
Cleanliness	2015/16 97.17% 2016/17 97.35% 2017/18 97.60% 2018/19 96.33%	Target of 95% achieved consistently across CP2

4.3.3. Ebbsfleet International

Table 7: Ebbsfleet International operational performance

Measure	Performance	Comment
Asset availability	2015/16 99.94% 2016/17 99.85% 2017/18 99.81% 2018/19 99.44%	Target of 99.65% achieved consistently across CP2.
Cleanliness	2015/16 97.17% 2016/17 97.29% 2017/18 97.27% 2018/19 97.63%	Target of 95% achieved consistently across CP2

4.4. CP2 renewals

4.4.1. Project governance improvements in CP2

The Station Concession Agreement focuses on operations and maintenance. NR(HS) has rights of first refusal on renewals projects as set out in the Station Concession Agreement. We have taken an active role in

developing renewals projects during CP2 to support NR(HS). Our overall aim is to deliver projects in a way that is value for money through our procurement approach, project management and delivery capability and relationships with suppliers (as set out in Section 9.5).

We have made significant progress in implementing a project management and 'stage gate' process which applies rigour and provides transparency of spend. This supports the necessary approvals from ORR and DfT for escrow withdrawals. We have also worked with NR(HS) to clarify the roles and responsibilities under the Stations Concession Agreement.

The renewals process at Ashford International works well with Mitie, with renewals being undertaken by Mitie Projects.

4.4.2. CP2 budget and outturn costs

Table 8 shows the forecast outturn renewal expenditure for CP2 by station compared with the renewal expenditure in the LCC budget for CP2. It should be noted that CP2 outturn figures are shown in 2013/14 prices for comparison.

Table 8: CP2 renewal expenditure by station (£ million)

Station	LCC budget (2013/14 prices)	Forecast CP2 outturn (2013/14 prices)
St Pancras	10.103	6.007
Stratford	1.739	1.690
Ebbsfleet	1.802	1.391
Ashford	3.099	2.355
Total	16.743	11.443

The main station renewal project in CP2 is the **Station Communications Systems Renewal** (SCSR). The LCC budget for SCSR across all four stations was £11.635 million (2013/14 prices), 70% of the total CP2 renewals budget. In September 2018, we awarded the contract for Systems Delivery Integrator (SDI) to Telent, who will be responsible for the SCSR system design and delivery. Telent will complete surveys and design by May 2019, with installation planned to be completed at all four stations by early CP3. Of the total SCSR cost, £4.8 million is expected to be incurred in CP3; this accounts for most of the difference between the CP2 budget and outturn seen in Table 8.

We submit an Annual Stations Portfolio Funding Paper to DfT in which we report on progress on existing renewal projects and describe the planned works over the next year. The paper provides a non-objection from DfT for a specified level of funding to progress projects to Gate 4 (Delivery) and for projects post-Gate 4.

Renewal projects are managed through the HS1 project process and internal project governance until they reach Gate 4 at which point the Gate 4 business case and certificate is submitted to the DfT for non-objection.

We provide quarterly updates to DfT on the portfolio in which we report on progress and present Gate 4 business case papers.

CP2 renewals projects for each station are discussed below. The projects are categorised as:

- Renewals in the LCC budget completed to date;
- Renewals in the LCC budget for the remainder of CP2;
- New renewals projects identified during CP2. These projects were not included in the CP2 LCC model and have been initiated through the change process;
- Projects on hold awaiting SCSR costing;
- Renewals in the LCC budget to be deferred to CP3;
- Renewals in the LCC budget proposed to be treated as Qx and carried out in CP3 (low value component replacements which will be more efficiently delivered as Qx, rather than through the renewals process); and
- Renewals in the LCC budget which are no longer required in CP2.

It should be noted that there are some renewals projects which seem to be deferred to CP3 as a result of the way the LCC budget was calculated.

The purpose of the LCC model was to determine the level of LTC funding to be paid by TOCs in CP2 to cover the cost of long term renewals. To do this, the model identified a specific year for each asset renewal and smoothed the cost across the preceding and following years in the ratio 30:40:30. Whilst this is an appropriate way to determine the levels of LTC funding to be paid by the TOCs it does not necessarily reflect how renewal projects are delivered. The three-year smoothing means that a project in Year 1 of CP3 will show 30% of its spend in the LCC budget. This is the case for the Specialist Building Management System (BMS) project where we have used a portion of the smoothed funds in the LCC budget for a technical scoping exercise with the remainder deferred to project delivery in CP3.

4.4.2.1. St Pancras International

CP2 renewals projects for St Pancras International are shown in Table 9.

Table 9: CP2 renewals at St Pancras International

Project	LCC budget (2013/14 prices)	CP2 outturn (2013/14prices)
LCC budget renewals completed to date		
Deck extension window cassette seal replacement	£65k	£65k
Fire compartmentation door ironmongery and seals	£100k	£100k
CCTV & Station Management System (SMS) (Note 1)	-	£0k (part of SCSR)
LCC budget renewals in the remainder of CP2		
SCSR	£8,396k	£4,223k
UPS renewal	£538k	£538k
Repainting of external gable ends	£173k	£173k
Building Management System (BMS) (Note 2)	£679k	£86k (part of SCSR)
Repairs to west side coping to energy centre	£36k	£36k
Terrazzo replacement	£68k	£68k
Surfacing, kerbs, external furniture/lighting	£45k	£45k
New projects identified in CP2		
CIS on the EMT gateline	-	£413k
Fire panel renewal (Note 3)	-	£248k
Proposed removal to Qx in CP3		
RZ baby change slate refurbishment	£3k	£0 (removed)

Note 1. The SCSR project identified the need for accelerated renewal of the CCTV and SMS system to mitigate operational risks. Part of the SCSR budget was brought forward for renewal of these critical assets.
Note 2. Technical scoping of BMS in CP2, system installation will be in CP3
Note 3. Renewal required because of obsolescence of panel control system cards/chips

4.4.2.2. Stratford International

CP2 renewals projects for Stratford International are shown in Table 10.

Table 10: CP2 renewals at Stratford International

Project	LCC budget (2013/14 prices)	CP2 outturn (2013/14prices)
LCC budget renewals completed to date		
CHW pipework distribution system	£34k	£0 (removed)

Project	LCC budget (2013/14 prices)	CP2 outturn (2013/14prices)
Fire compartmentation door ironmongery and seals	£9k	£9k
Replacement of waste water plastic pipework	£5k	£5k
Initial technical scoping project for AHU system	£6k	£6k
Breach and landing valve cabinets	£6k	£6k
Replacement of EFTE pump	£7k	£0 (removed)
LCC budget renewals in the remainder of CP2		
SCSR	£1,407k	£1,207k
BMS (Note 1)	£	£0k (part of SCSR)
New projects identified in CP2		
Escalator renewal (Note 2)	-	£413k
On hold pending final SCSR costs		
Survey and refurbishment of toilets ~~and gate barriers~~	£207k	£43k
Renewals deferred to CP3		
LTHW pipework distribution system	£	-
Proposed removal to Qx in CP3		
Taps and fittings replacement	£9k	£0 (removed)
UPS capacitors	£1k	
Works to combined sounders and detectors	£8k	

Note 1. Technical scoping of BMS in CP2, system installation will be in CP3
Note 2. Accelerated renewal to address the issue of regular escalator failures with impact on operational performance of the station.

4.4.2.3. Ebbsfleet International

CP2 renewals projects for Ebbsfleet International are shown in Table 11.

Table 11: CP2 renewals at Ebbsfleet International

Project	LCC budget (2013/14 prices)	CP2 outturn (2013/14prices)
LCC budget renewals completed to date		
CHW and LTHW pipework distribution system	£86k	£0 (removed)
Fire compartmentation door ironmongery and seals	£5k	£5k
Replacement of waste water plastic pipework	£7k	£7k
Works to compressed air distribution system	£6k	£6k
Breach and landing valve cabinets	£6k	£6k
LCC budget renewals in the remainder of CP2		
SCSR	£1,545k	£1,324k
BMS (Note 1)		£0k (part of SCSR)
On hold pending final SCSR costs		
Survey and refurbishment of toilets ~~and gate barriers~~	£91k	£43k
Proposed removal to Qx in CP3		
UPS capacitors	£1k	£0 (removed)

Note 1. Technical scoping of BMS in CP2, system installation will be in CP3

4.4.2.4. Ashford International

CP2 renewals projects for Ashford International are shown in Table 12.

Table 12: CP2 renewals at Ashford International

Project	LCC budget (2013/14 prices)	CP2 outturn (2013/14prices)
LCC budget renewals completed to date		
Lift and escalator renewal (Note 1)	£575k	£626k
Air handling units	£297k	£297k
Extract/supply/smoke fans and hydrovane	£273k	£273k
Repair/replacement of glass blockwork seals	£117k	£0 (removed)
Fire compartmentation door ironmongery and seals	£89k	£89k
Tandem seating	£90k	£83k
Bird-proofing	£75k	£0k
BMS head end control firmware replacement	£75k	£75k
Replacement of window seals	£59k	£0 (removed)
UKBF passport and check-in desk replacement	£100k	£31k
Sump pump and CHW equipment (Note 2)	£44k	£21k
Boilers combined heating system works	£77k	£357k
Replacement of smoke curtain	£24k	£25k
External lighting	£13k	£7k
External aluminium doors	£37k	£32k
LCC budget renewals in the remainder of CP2		
SCSR	£305k	£308k
Electrical distribution systems	£130k	£130k
Renewals deferred to CP3		
Escalator renewal (Note 1)	£	£0
Painting link bridge	£402k	(removed)
Fan coil units	£47k	
Link bridge IPS	£21k	
UPS capacitors	£38k	
Chillers	£50k	
Proposed removal to Qx in CP3		£0
Replace glazed fire-resistant doors	£12k	(removed)
Paint emulsion to plaster surfaces	£	
Terrazzo repairs	£1k	
Suspended ceiling works	£5k	
Sink	£2k	
Not required in CP2		£0
Genie boom (Note 3)	£20k	(removed)
MEWP replacement (Note 3)	£36k	
External furniture and resurfacing	£89k	

Note 1. Increased scope for lift and escalator renewal following survey in 2016/17. The resulting cost was greater than the approved LCC model amount and led to the decision to undertake lift renewal in CP2 and defer escalator renewal to CP3, based on condition assessment.
Note 2. Sump pump renewed under Qx (£23k)
Note 3. Not required following 2014 renewal with a single multipurpose machine that meets high level access requirements inside and outside the station.

4.5. Renewals escrow accounts

The LTC paid by train operators is designed to fund future renewal of the HS1 stations. The funds collected from the LTC are paid into a separate escrow account for each station; funds may only be used to fund renewals and are not transferrable between accounts and/or between stations. The

escrow accounts are held in joint names and withdrawals require two DfT approved signatures. There are due diligence checks to support the processes and an annual DfT audit requirement.

The provisions of the HS1 Lease allow for cash to be moved into Authorised Investments to earn a greater return. Interest earned from escrow bank accounts and Authorised Investments offsets future renewals funding requirements.

The total station renewals annuity for CP2 was £6.55m in 2018/19 prices (£5.83m in 2013/14 prices), split between the stations as shown in Figure 3. 65% of the annuity was for renewals at St Pancras International, with a roughly equal split of the remaining 35% between the other three stations.

Figure 3: CP2 renewals annuity by station (£m, 2018/19 prices)

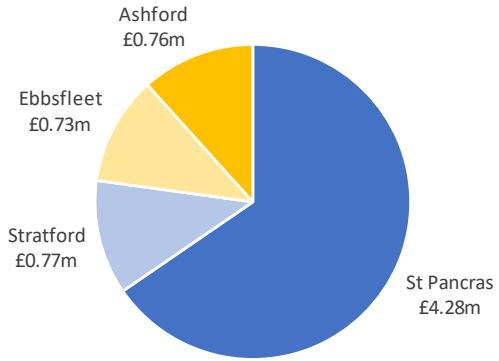


Table 13 shows escrow account movements in CP2 and comparison of outturn with CP2 model for all four stations combined.

Table 13: Escrow account movements in CP2 - all four stations combined (£000 nominal)

	CP2 model	CP2 outturn forecast	Variance	% variance
Opening balance	24,678	24,669	-9	0%
Receipts	32,500	32,269	-231	-1%
Withdrawals	-18,165	-10,783	7,382	-41%
Interest	3,386	2,026	-1,360	-40%
Closing balance	42,400	48,181	5,781	14%

Reconciliation:

- The overall CP2 opening balance for all four stations was as forecast with the opening balance for Ashford being higher than forecast and opening balances for the other stations slightly lower than forecast;
- Receipts are expected to be slightly lower than the CP2 forecast for each of the four stations;
- As a result of the changes in CP2 renewals spend discussed in Section 4.4, withdrawals are expected to be 41% lower than the CP2 forecast overall.
- Market conditions coupled with delays in executing our investment strategy have resulted in interest received being lower than forecast. At the time of PR14 we assumed interest rates of 1.37% in 2015/16 rising to 3.73% by 2019/20. Actual interest rates have been significantly lower than forecast. As a result, interest is expected to be 40% lower than the CP2 forecast overall.

The net effect is that the closing balance for all four stations combined is expected to be 14% higher than was forecast. Table 14 shows the expected CP2 escrow account closing balance by station. It shows that proportionally, the lower spend at Ashford International is the most significant impact.

Table 14: Escrow account CP2 closing balances (£000 nominal)

	CP2 model	CP2 outturn forecast	Variance	% variance
St Pancras	27,196	30,177	2,981	11%
Stratford	5,633	5,865	232	4%
Ebbsfleet	6,484	7,048	564	9%
Ashford	3,087	5,092	2,005	65%

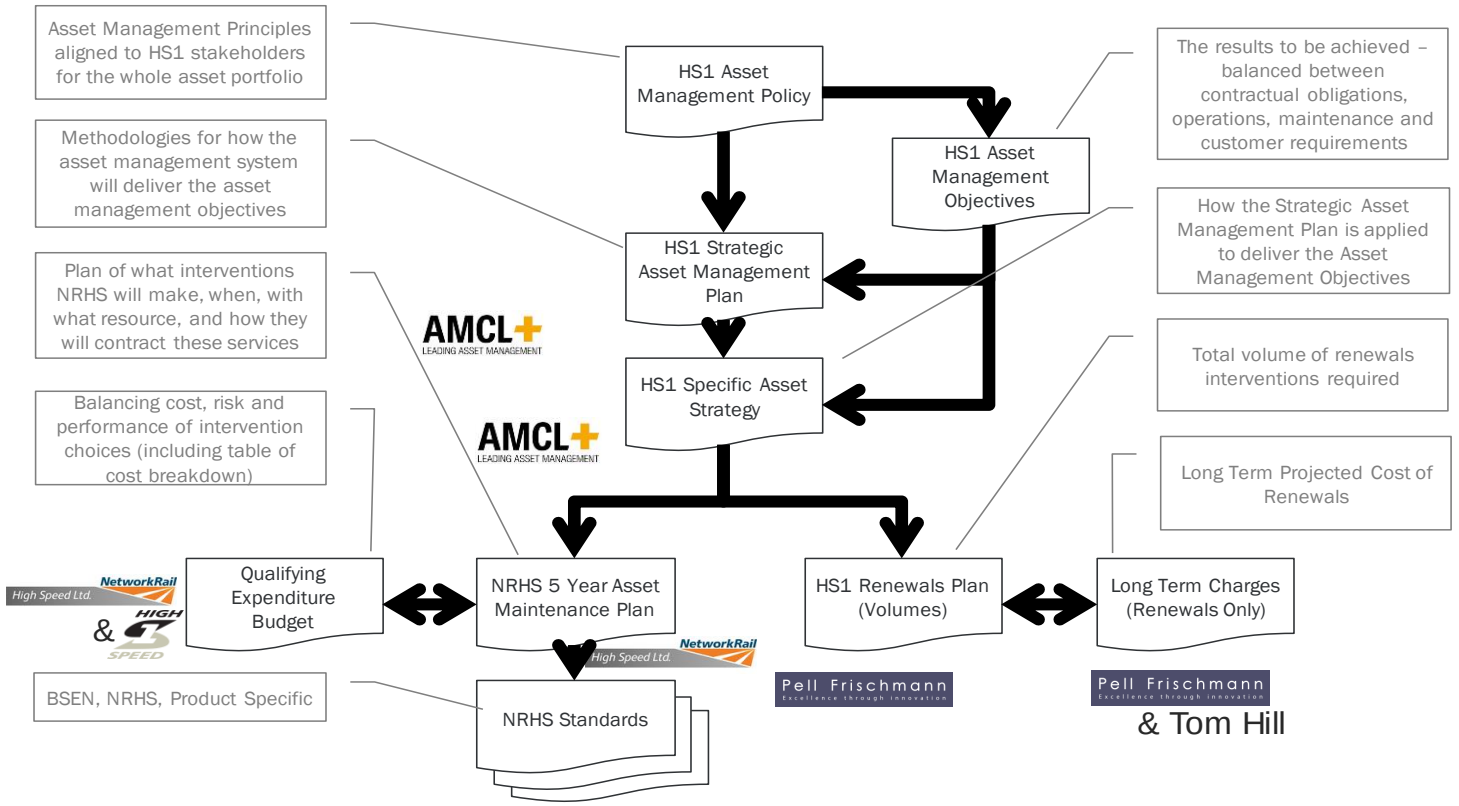
Part 2: Our Plans and Costs for CP3

5. Overview of approach for CP3

This part of our Stations LTC Review covers our proposals for CP3. It provides further detail about the key steps of analysis – represented by the figure below. It includes the following methodological elements:

- **Outputs** that are required to deliver benefits for our operators, in line with the vision set out earlier.
- Our approach to **safety and security** at stations and the improvement plans we are putting in place to improve workforce and passenger safety.
- Our **asset management approach**, including how we have identified the critical assets, and the system by which we will improve decision-making.
- How we identify the **renewals volumes and costs** implied by following the asset management approach.
- And finally, converting the costs into an annuity so that the lumpy renewal spend is spread out over time, and then allocated between operators as the **Long Term Charge** that each operator pays.

Figure 4: Approach to developing the Long Term Charge proposals



6. Our outputs for CP3

Unlike other regulated industries we do not have binding regulatory output targets. For CP3, we have developed a set of outputs based on our consultation with stakeholders. We have used these outputs to inform the development of our plans for CP3 and beyond.

The purpose of HS1 is to deliver for our customers, and in turn for their customers – the travelling public. HS1 is a relatively new and strategically important piece of infrastructure used by domestic high-speed commuters and connecting international passengers to France, Belgium and further afield. Our stations provide the gateway to passenger journeys on HS1 and are a key part of the overall passenger experience. We need to maintain seamless quality across the HS1 route and stations in terms of safety, performance, passenger amenity and overall satisfaction. We need to do this at a cost that is value for money and be hungry about chasing future efficiencies.

The nature of our railway is such that we engage closely with our customers on a day-to-day basis, and we are always open to reviewing and improving the service that we provide. The National Rail Passenger Survey (NRPS) is a 6-monthly snapshot of our performance and provides an important insight (and reinforcement) of our approach. We have supplemented this with our own more targeted monthly surveys of station users – called Station Matters.

PR19 provides an opportunity to test more formally what customers want. Dialogue with our key stakeholders is critical to our purpose and to the success of the PR19 process itself.

We commenced this dialogue with informal 1:1 interviews with all stakeholders in April and May 2017 to discuss their aspirations for PR19; key messages from these meetings were presented at the stakeholder workshop in June 2017. We used these stakeholder aspirations to develop a set of outputs for CP3 which are listed below. These outputs were presented in the October 2017 stakeholder workshop.

Outputs for CP3
Maintain good condition of the railway to preserve long-term sustainability
Continued improvement in safety culture to deliver our vision of everyone home safe every day
Continued excellent performance, less than 10 seconds per train from infrastructure delay
Improved resilience – reduce the impact of big incidents within the risk appetite of operators
Improve railway availability in a predictable way to assist freight
Understand and work to best deal with whole life cost through smart asset management and engineering solutions
Lower costs within CP3 without compromising long-term sustainability
Reduce carbon emissions
Fully understand the operational criticality of stations assets, and devise asset management plans to deliver this

As most of these outputs focus on route. For stations, we have supplemented them with the Asset Management Objectives that are a key driver of the asset interventions we make. The following table sets out the objectives at two levels, and links them to the overall business attribute.

Business Attribute	Asset Management objective (Level 1)	Asset Management objective (Level 2)
Safety	We will manage our assets so that the risk of a safety incident is as low as reasonably practicable.	Maintain or improve the management of the assets to improve the safety KPIs, by the end of CP2.
		Understand the impact of the deterioration of assets on probability of failure and potential safety risk, by the end of December 2018.
		Staff will continue to be encouraged to raise concerns and propose improvements through routine briefings and use of the close call system, by the end of December 2019.
Punctuality	We will manage our assets so that passengers arrive on time.	To identify and rank the Stations assets that might impact on passenger perturbation and the Service Standards, by the end of December 2018.
		To identify the Stations asset improvement activities that impact on passenger perturbations that are required to meet or exceed the target standards of service, by the end of July 2019.
Availability	We will manage our assets sustainably, such that the availability of route assets will meet the needs of our passengers and the train operating companies.	To identify the asset classes that affect availability and that will impact on the new Service Standards and set availability targets, by the end of December 2018.
		To identify the stations asset improvement activities required to meet or exceed the Station Access Conditions and Service Standards, by the end of July 2019.
		To identify the stations assets that impact on passenger service, security and safety elements that contribute to the passengers' overall comfort levels and promote the new Service Standards, by the end of December 2018.
		Develop and agree a consistent approach to the station's asset hierarchy with station operators, by the end of July 2019.
		Identify the Landlords Assets, and their failure modes, whose performance may impact on HS1 retail clients, by the end of December 2018.
		Collect suitable Asset Information to determine the Asset Health condition – to influence future decision-making processes around asset investment, by the end of December 2018.
Cost	We will ensure that the total cost (maintenance and renewal) of managing our assets is demonstrably cost effective and provides good value by optimising cost, risk and performance.	Build the stations assets into the Asset Decision Support Tool (Whole Life Cost model) to optimise intervention regimes, by the end of July 2019.
		To re-evaluate the condition and lifespan of assets to optimise the intervention derived from the Long-Term Cost model, by the end of December 2018.

7. Safety and security

Safety is central to all that we do. Our safety performance is good but we strive for continuous improvement. Our goal is to achieve zero harm to all staff, industry partners, suppliers, contractors, passengers and members of the public through the effective management of health and safety on HS1. We all have a duty to take care of our own health and safety and that of others who may be affected by our actions at work.

Our strap line "*Safety is no accident – we all play our part*" was developed by HS1 staff in 2013 and endorsed by the senior management team.

7.1. HS1 Health & Safety Management System

In CP2, we updated the HS1 Health & Safety Management System (HSMS) to reflect our evolving role as intelligent client.

Figure 5: HS1 Health & Safety Management System

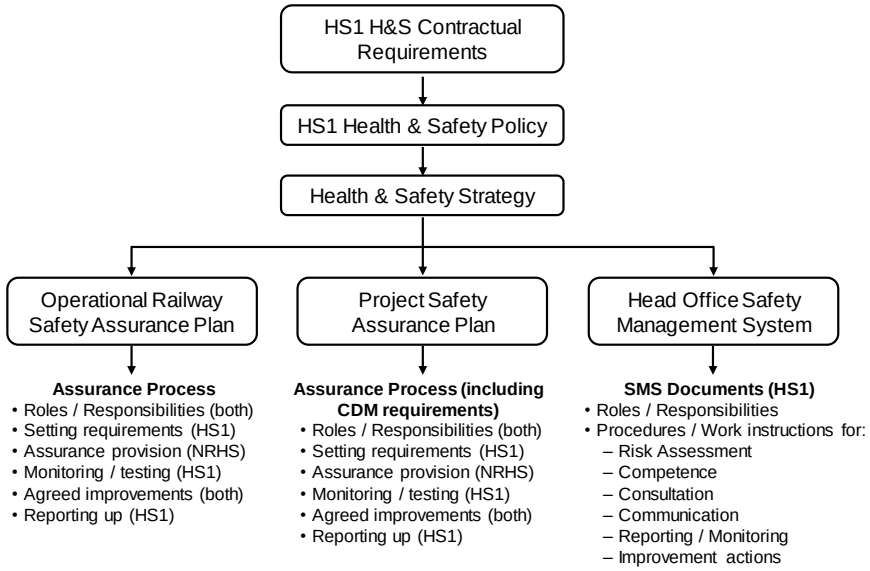


Figure 5 shows an outline of the structure of our HSMS. Our approach demonstrates a clear division between our responsibilities for our own organisation and the assurance process for the management of our industry partners.

The key documents in the HS1 HSMS are:

- **HS1 Health & Safety Policy:** this sets out how we will maintain and continually improve our HSMS. It references our systems for managing our industry partners, suppliers and contractors (including setting specific health and safety objectives and monitoring performance against these objectives) and supporting our industry partners in establishing good health and safety management by the provision of funding through the various commercial arrangements in place.
- The **Health & Safety Strategy** describes how the HSMS and high level processes are divided between direct management at our head office and assurance of the operational railway and associated project work.
- The **Operational Railway Safety Assurance Plan** establishes what is required of NR(HS), Mitie and UKPNS and sets out the processes by which we gain assurance that these organisations are meeting these requirements.
- The **Project Safety Assurance Plan** establishes what is required of our principal contractors and details how we gain assurance that these organisations are meeting both HS1 and regulatory requirements.
- The **HS1 Head Office Safety Management System** is focused on our own responsibilities and demonstrates a clear commitment to protect our own staff, contractors and visitors to our offices.

7.2. Delivery of operational safety and security at HS1 stations

NR(HS) holds the Safety Authorisation and has prime responsibility in law for the safe operation of St Pancras International, Stratford International

and Ebbsfleet International stations. Mitie holds the Safety Authorisation for Ashford International station.

The role of Mitie at Ashford International is different to that of NR(HS) at the other HS1 stations. NR(HS) is responsible for asset management and railway operations at the stations whereas Mitie is responsible only for asset management at Ashford International with EIL responsible for railway operations.

The NR(HS) and Mitie Safety Authorisation documents (authorised by the ORR) describe their Safety Management Systems (SMSs) and reference the processes and procedures by which safety will be delivered. The outputs from the SMSs will deliver the majority of measures to provide assurance of the effectiveness of the delivery of safety and security at stations.

It is important to us that there should be continuous improvement in the safety performance of our system, so far as is reasonably practicable, and this is also one of the requirements of the European Railway Safety Directive. NR(HS) produces an Annual Safety Plan in which it sets out how it intends to improve safety and Mitie produces an annual QHSE Business Plan for HS1. In accordance with our safety objectives, we review these plans to satisfy ourselves that sufficient provision has been made by NR(HS) and Mitie to enable their delivery.

NR(HS) is also responsible for maintaining the security of the railway, including St Pancras International, Stratford International and Ebbsfleet International stations, in conjunction with the BTP and security contractors. HS1 Ltd is responsible for security at Ashford International and discharges its responsibility through Mitie, with appropriate assurance in place.

HS1 Ltd maintains contact with the ORR, as the infrastructure safety regulator, though the formal regulatory relationship is with the Safety Authorisation holders (NR(HS) and Mitie). The ORR responsibilities are discharged through formal intervention plans, professional liaison, assurance activities and incident investigation with the two duty holders.

7.2.1. Audit and assurance of operational safety

Audit and assurance are important tools to measure performance against the specifications described in NR(HS)'s SMS.

The ROGS require NR(HS) to carry out internal audit of compliance to its Safety Authorisation. NR(HS)'s annual audit programme is consulted with HS1 Ltd at the start of each year. NR(HS) advises us of key audit findings in the Safety, Environment Assurance Report (SEAR), and when necessary these are reviewed with relevant HS1 Ltd personnel.

We use assurance to provide regular feedback on the safety performance of the SMS using the 4-weekly SEAR in which NR(HS) collates various outputs of the SMS. The SEAR is sent to us, as well as reviewed internally by the NR(HS) senior management team. It is also reviewed at a Director level meeting between HS1 Ltd and NR(HS).

Our quarterly HS1 Assurance Meetings with NR(HS) provide additional longer term safety assurance. These meetings, which are independently chaired, review route engineering and station activities, event precursor information and learnings from any key incidents.

For Ashford International, Mitie undertakes periodic station audits and inspections which include safety. Safety and security reporting is included in Mitie's four-weekly SMA Operational Report. Safety is part of the agenda in our four-weekly meetings with Mitie and the formal quarterly reviews (which also include EIL).

7.3. Safety strategy for CP3

Our strategy to deliver the safety vision and objectives during CP3 is focused on:

- Developing and embedding organisational understanding of risks and precursors to predict and manage risk; and
- Building on and improving safety culture maturity.

This is a natural progression from the safety activities undertaken in CP2, with the aim of aligning NR(HS) with its objective of "moving towards an

industry best safety culture and industry leading safety management system". This is important as the HS1 asset ages and moves from a relatively new railway to a railway requiring asset renewal, introducing different risks and different methods of working which NR(HS) must manage effectively.

The adoption of the Risk Management Maturity Model (RM3) allows NR(HS) to define what excellence looks like in safety and risk management. It is an industry recognised tool, developed by the ORR, that details common criteria against which levels of current organisational maturity can be measured. It assists in the identification of activities which, if undertaken, would provide a greater demonstration of cultural maturity.

As well as continuing to use traditional risk assessment practices, CP3 will see a move towards further introduction and embedding of risk management techniques to assist in the prediction of risk. These techniques reflect changes in risk due to the changing nature of the asset.

The increase in renewals introduces a potential increase and change in the nature of occupational safety risk. The safety strategy for CP3 recognises this changing environment and the need to embed safety into the entire renewal lifecycle from planning, movement of materials, accessing the infrastructure through to completion of physical works. Embedding safety risk management across the organisation introduces an integrated approach to reducing safety risk.

NR(HS) has the following station workforce safety improvement initiatives:

- Workforce safety: practical problem-solving exercises to engage station staff and identify activities that can help reduce the likelihood of accidents, for example in the areas of: sharps risk, and PPE gloves trial to address potential trapped hand injuries.
- Manual Handling Training, given that this accounted for a quarter of workforce injuries in the last year.
- Improving contractor safety culture relationships. Contractors that have had proportionately high safety incidents have adopted the NR(HS) 'go, look, see' initiative and rolled it out across London sites.
- Stations staff engagement and support.

NR(HS) also has a number of passenger safety initiatives:

- Practical problem-solving exercises to really understand the drivers of escalator incidents. This identified opportunities to make the escalator safety messages more apparent to influence passenger behaviour and choices.
- Introduction of a Festive Safety Plan given the higher risk from passengers under the influence of alcohol.

We have a different approach with Mitie at Ashford International given the lower risk of Mitie's operations (the scope of the contract covers only asset management and passenger numbers are low).

Mitie continually strives to embed a strong safety awareness culture throughout its business. Mitie has an annual QHSE Business Plan for HS1; for 2018/19 this plan has five objectives:

- People: develop and improve our safety culture ensuring the Work Safe Home Safe ethos is embedded in the business;
- Governance: implement an effective governance framework which ensures the business is 'audit ready';
- Legislation: provide professional advice on existing and forthcoming legislation;
- Risk management: implement an effective risk management framework which designs out risk and/or introduces effective mitigation; and
- Behavioural safety: implement a framework which reinforces the HS1 ethos *"Safety is no accident – we all play our part".*

7.3.1. Security strategy for CP3

Our security strategy is to provide infrastructure that can be operated safely and efficiently. Security risks to railway users and systems, and to those affected by the railway are controlled to as low as is reasonably practicable taking into account the following factors:

- Likelihood of risk occurring;
- Costs and benefits;

- Funding and resources; and
- Views of relevant stakeholders.

At stations, security complies with mandatory standards (National Rail Security Programme) set by the DfT Land Transport Security Division (LTS). In addition, security within the Restricted Zones at stations and the Temple Mills International Depot complies with the requirements of the Channel Tunnel Security Order 1994.

Because the security threat varies over time, security arrangements are always subject to review.

7.4. Measuring safety performance

Safety performance is measured through a variety of activity and outcome indicators, each tailored towards providing not only assurance of specific activities but also assurance of overall safety performance. Precursor identification, introduced in CP2, provides a means for the proactive monitoring of elements which contribute to catastrophic safety risk, allowing for pre-emptive risk mitigation actions to control catastrophic risk. Hazardous events, and the corresponding precursors, will be continuously reviewed to make sure the change in the infrastructure risk profile in CP3 is appropriately reflected.

Outcome, or lagging, indicators will include, as a minimum, the present 20 indicators currently reported against by NR(HS), with this information provided on a periodic basis. Activity (leading) indicators include precursor information and RM3 criteria to monitor and drive continuous improvement in safety and risk management. Information will be provided by NR(HS) through a number of channels, including periodic compliance dashboards, period safety performance reports and formal contract liaison arrangements.

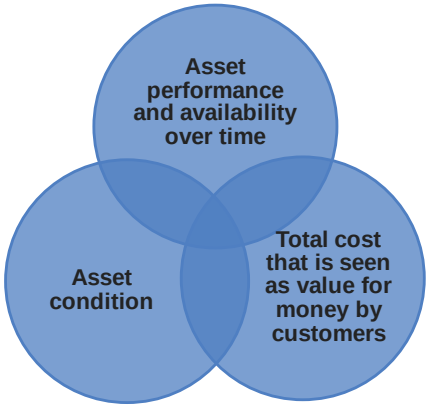
Mitie reports accidents to members of the public; accidents and FWI for workforce and contractors and near-miss incidents on a periodic basis.

Reporting performance against the Common Safety Indicators (CSIs) is the responsibility of NR(HS) and Mitie as Duty Holders under ROGs. Data is collated by RSSB, on behalf of the ORR, and is submitted on a national basis to the EU Agency for Railways.

8. Asset management approach

8.1. Overview

Under the HS1 Lease, our overarching asset stewardship obligation is to ensure that each station is in “good and substantial repair and condition” throughout the concession. Our asset management challenge is to manage the HS1 stations in a sustainable way to ensure we achieve the asset condition requirements in the HS1 Lease and maintain high asset performance and availability while providing value for money for train operators. Building the shared capability with our supply chain to meet this challenge is a long term, step-by-step project that goes beyond individual periodic reviews.



In PR14 we made a commitment to improve our asset management capability. This section details the key components of the asset management system that we have embedded to satisfy that commitment. The section also describes how we will build on this base through the asset management maturity journey. Further detail is provided in the accompanying Stations Strategic Asset Management Plan (Stations SAMP).

The purpose of all the work set out in this section is not to implement a new system for its own sake. The benefit is that we will make better decisions – leading to better service delivery and/or value for money:

- It makes us focus on the link (or the ‘line of sight’) between operator objectives and the work we do. If something doesn’t contribute to outcomes then we will not do it.
- We will better understand how important the assets are. If the failure of an asset is unlikely to be service-affecting then we are likely to be able to replace later rather than earlier, saving money.
- The system provides the tools that will enable us to evaluate different options in future, understanding the trade-offs between maintenance and renewal interventions, as well as relative contribution to objectives.

8.2. Working with suppliers

We have successfully retendered the management of Ashford International station, and work with Mitie to continuously improve.

Our Station Concession Agreement with NR(HS) covering the other three HS1 stations was part of the arrangements inherited on at the start of our concession. Unlike the Operator Agreement for the HS1 route, there is no provision to undertake a market test or review of the contract before its expiry in 2086. The contract also has other deficiencies such as not being completely clear about the split of responsibilities between HS1 Ltd and NR(HS).

Despite these limitations, we have led positive discussions with NR(HS) to improve service delivery:

- Staffing changes – to make sure the right people are in the right jobs;
- Structural changes – to have a fit-for-purpose organisation with the right positions that respond to changing circumstances; and
- Process changes – understanding who does what between the organisations and associated decision-making.

NR(HS) has made commitments to improve its capability in line with changing requirements. For example, the changes in staff necessary to address the GTR transition, and empowering a single accountable person

across facilities management and station operations to deliver for operators and their customers.

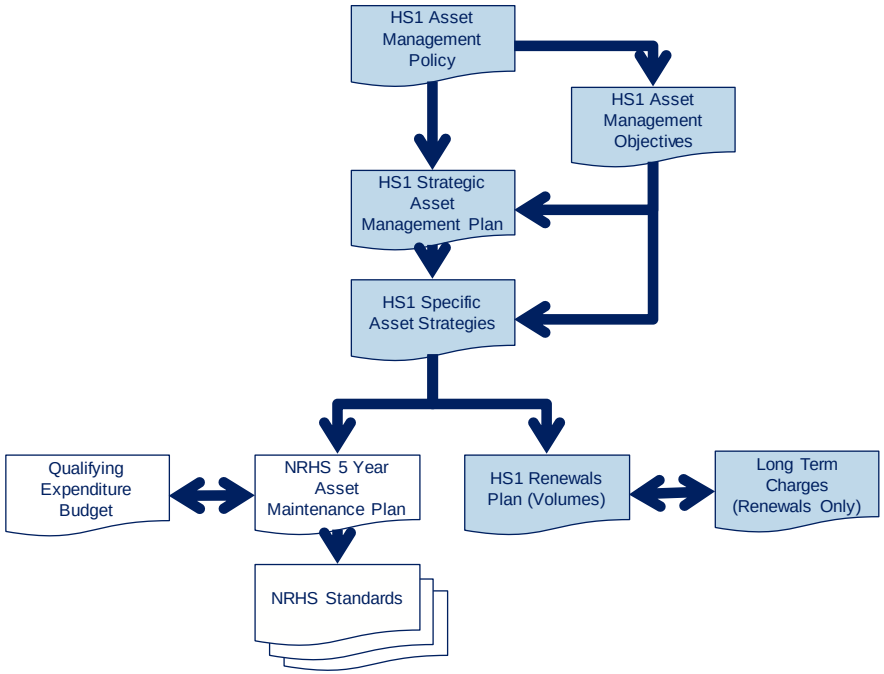
8.3. Asset Management System

During CP2, we have improved our Asset Management System, aligning it with ISO 55000. The components of the stations asset management system are summarised in Figure 6 and discussed in the remainder of this section.

Route and stations have been harmonised, with a single asset management framework approach, a common Asset Management Policy and common Asset Management Objectives. The overall structure is the same as for the HS1 Route, but the spilt of responsibilities is currently different, with HS1 Ltd currently being responsible for the majority of the asset management documentation (the areas coloured blue in the figure). This is described as the “deep model”.

This diagram also describes the arrangements for Ashford International station, with NR(HS) replaced by Mitie.

Figure 6: Stations asset management framework



We started by refreshing the HS1 Asset Management Policy and creating a new set of HS1 Asset Management Objectives (AMOs) that place customer requirements at the centre of our asset management. The policy and the AMOs are the same for route and stations.

The **HS1 Asset Management Policy** reflects our commitment to deliver sustainable operational performance and asset availability through world leading asset management. It confirms that we will:

- deliver our shareholder requirements, comply with our contractual obligations, and endeavour to outperform stakeholder expectations;
- engage with our suppliers to ensure Asset Management Objectives are cascaded and the approach to asset management is consistent;

- define asset management roles and accountabilities between HS1 Ltd and our supply chain;
- continue to build a customer oriented culture with a structured approach to stakeholder engagement;
- use the Asset Management Objectives to anchor asset intervention decision-making to be consistent with customer expectations;
- continually improve Asset Management capability in line with other leading industry practitioners, following the principles of ISO 55000 asset management best practice; and
- measure asset management capability through a series of key performance indicators.

The **HS1 Asset Management Objectives (AMOs)**, shown in Table 15, help shape our decisions about how to operate, maintain and renew our assets, placing customer requirements at the centre of our asset management. The AMOs have been tested through the CP3 stakeholder engagement sessions and have received positive feedback.

Table 15: Asset Management Objectives

Business Attribute	Asset Management Objective	Weighting
Safety	We will manage our assets so that the risk of a safety incident is as low as reasonably practicable	25%
Punctuality	We will manage our assets so that passengers arrive on time	20%
Availability	We will manage our assets so that the availability of route and stations assets will meet the needs of our passengers and the train operators	20%
Cost	We will ensure that the total cost (maintenance and renewal) of managing our assets is demonstrably cost effective and provides good value by optimising cost risk and performance	15%
Passenger Satisfaction	We will manage our assets to maintain the asset related elements of the NRPS score at or above the current levels.	15%
Passenger Comfort	We will manage our route assets to give a ride quality that is rated good or outstanding by over 90% of our customers.	5%
Legal compliance	We will comply with all legislation, HS1 consents, Historic England conditions and environmental policy commitments	Mandatory

The **HS1 Strategic Asset Management Plan (SAMP)** describes the methodologies we will use to deliver the HS1 Asset Management Policy and AMOs, providing guidance for the development of the Specific Asset Strategies (SASs). It includes an assessment of our current stations asset management capability, covering both HS1 Ltd and our supply chain and describes how and when we will improve our asset management capability.

The **HS1 Specific Asset Strategies (SASs)** apply the methodologies in the SAMP for each asset class. The purpose of the SASs is to provide a systematic, efficient and consistent approach to managing the lifecycle activities for all the assets across the four stations. They describe the assets in a specific class, the asset criticality and the required interventions (operation, inspection, maintenance and renewal).

There are SASs for six different asset groups, based on the asset hierarchy in the BCIS Elemental Standard Form of Cost Analysis. The SASs consider the unique features of each station, such as passenger demand and system redundancy requirements. The six SASs and the assets covered in each are summarised in the table below.

Table 16: SASs and assets covered

SAS	Assets covered
Substructures	Foundations; Lowest floor construction; Retaining walls.
Superstructures	Frame; Floors; Link bridges; Roof; Stairs; External walls; Windows and external doors; Internal walls and

SAS	Assets covered
	partitions; Internal doors
Internal Finishes	Wall finishes; Floor finishes; Stair finishes; Ceiling finishes.
Fittings, Furnishings and Equipment	Fixed furniture.
Services	Sanitary installations; Services equipment; Disposal installations; Water installations; Heat source; Space heating and air treatment; Ventilation systems; Electrical installations; Fuel installation/systems; Lift and conveyor systems; Fire and lightning protection; Specialist installations; Communication, security and control systems.
External Areas	Car parks; Roads; Footpaths; Soft landscaping; Incoming services and statutory connections; Drainage; Site lighting; Fencing/compounds; External signage.

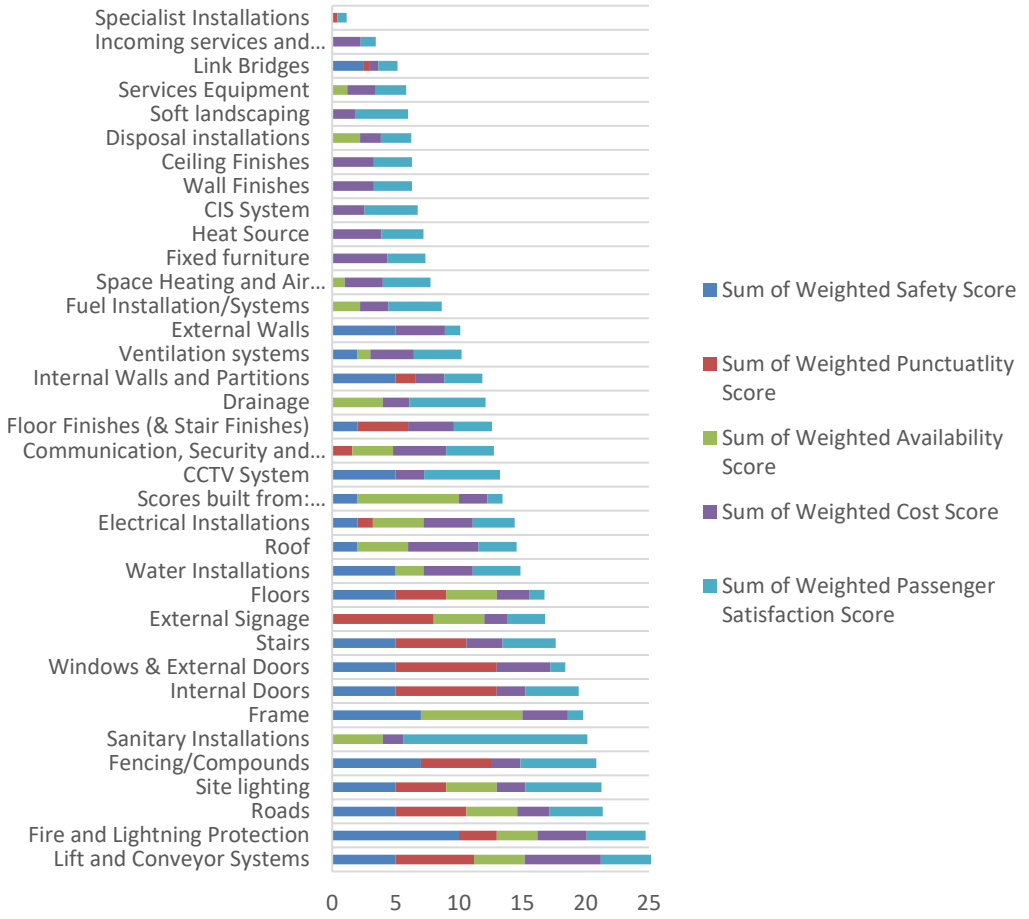
The development of the SASs is part of our asset management maturity journey. The SASs developed in CP2 replace the Asset Specific Policies (ASPs) developed during CP1 and represent a significant improvement in asset management maturity. As well as the improved line of sight from objectives through to interventions, the system improves our understanding of:

- Asset hierarchy;
- Asset information; and
- Asset criticality - the relative importance of each asset group in delivering the AMOs.

The current SASs describe what we currently do or plan to do; inspection and maintenance interventions are from supply chain maintenance system information and renewals are from the LCC model. We will continue to develop the SASs in CP3 to enhance our decision-making for CP4.

The results of the criticality analysis across all stations is shown in Figure 7. This shows the importance of the lift and conveyor systems in achieving the AMOs. The underlying scoring system and detailed analysis can be found in the SAMP which also provides detail on a station by station basis.

Figure 7: Results of criticality analysis



The **HS1 Renewals Plan** details the planned renewals and cost estimates for the 40 years from 2020 to 2060. The 40-year costs form the basis of the annuity charge for each station. For CP3, we have developed the HS1 Renewals Plan by reviewing and updating the CP2 Life Cycle Cost (LCC) models as described in Section 9.2. The work we have done in developing the SASs has influenced the LCC models but the SASs do not directly drive the interventions in the models. In future periodic reviews, the HS1 Renewals Plan will be driven directly by the SASs.

8.4. Our asset management maturity journey

We have undertaken a gap analysis based on the 39 asset management subjects in the Asset Management Excellence Model and set out a roadmap to improve our asset management capabilities.

We have cross-referenced each element of the journey against the detailed AMOs, and identified the timeline so that we have a prioritised list of activities. The key activities include:

- Better integrating demand analysis into our renewals planning, including the impact on specific assets;
- More targeted data collection, starting with the most critical assets, so that we can better understand the link between usage, performance and degradation over time;
- An improved asset management system that provides the right data to the right people;
- Enhanced supply chain relationships, including with our key suppliers and their sub-contractors in turn;
- Ongoing improvements in our project management capabilities; and
- Enhancing the linkage between Qx and LTC so that we can start to undertake whole-life cost analysis.

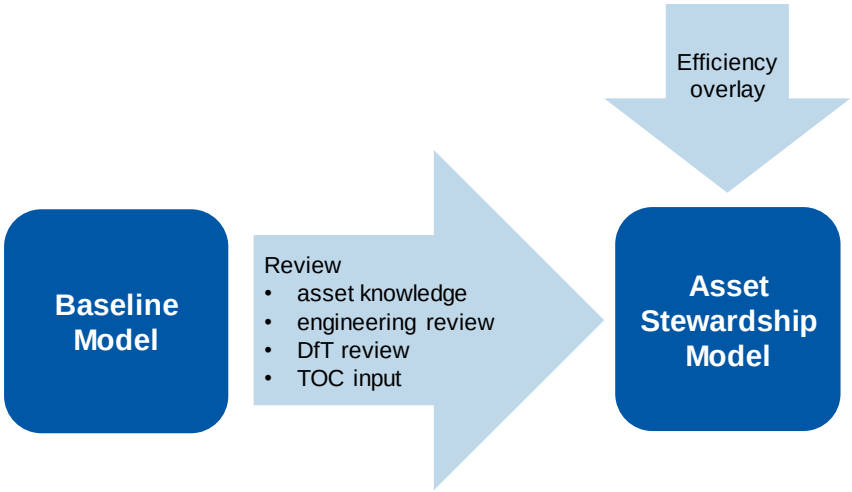
9. Renewals activities and costs

9.1. Overview

In parallel with the development of the asset management system described in the previous section, we have also been developing the specific plans around the volumes of renewal interventions required, and the associated costs of such works.

For PR14, we initially developed the Baseline model (for 2015 to 2060), based on continuing current practice and assumptions. We then challenged and refined our assumptions on a line-by-line basis based on our asset knowledge and with input from train operators, DfT and external engineers to develop the Asset Stewardship model which reduced costs by extending renewal cycles for some assets. Costs were also reduced by the inclusion in the Asset Stewardship model of an efficiency overlay of 0.6% per annum compounded over the 45 years. The Asset Stewardship case formed the basis of our proposals for CP2.

Figure 8: PR14 Life Cycle Cost modelling



The Life Cycle Cost (LCC) models developed for CP2 were signed off by DfT as meeting the concession requirements and we have therefore used these models as a starting point for PR19.

We commissioned an independent review of the renewal cycles and costs (direct and indirect) in the LCC models. The cost review included benchmarking against similar projects at a system level.

9.2. Review of LCC models

The LCC models developed for CP2 were approved by DfT as meeting the concession requirements. For CP3, we have therefore reviewed and updated these models rather than fundamentally changing our approach. The aim of the review was to:

- Ensure a common model structure and language for all four station models;
- Embed a common system-level hierarchy for each station model;
- Ensure high confidence in unit costs;
- Have robust life cycle periods for all asset systems;
- Acknowledge TOC operational criticality / customer requirements; and
- Incorporate asset management systems in the models.

We commissioned Pell Frischmann (PF) to review and update the LCC models for the four HS1 stations for the 40 years from 2020 to 2060 (CP3 to CP10). As part of this review PF:

- Reviewed the existing models;
- Aligned the models with the 4th edition of the Building Cost Information System (BCIS);
- Assigned a unique reference number (URN) to each component in each station model;
- Revised the asset hierarchy in the models from component level to system level;
- Reviewed the renewal cycles in each model; and
- Reviewed the direct and indirect costs in each model.

The review included a high-level consideration of potential masterplanning interventions. For CP3, there are no major systems renewals that coincide with masterplan works and no changes were made to the LCC models. This will be reviewed for CP4.

The four models generate a Life Cycle Cost (LCC) for each station. This is an input to the LTC model that calculates a renewals annuity for each station (see Section 10).

9.2.1. Asset hierarchy

The asset hierarchy is the level of detail used to forecast renewal costs. There is a balance – it must be detailed enough to provide transparency about how we have developed cost forecasts, but not so detailed as to cause administrative difficulties in the escrow withdrawal process.

The asset hierarchy in the models is based on the BCIS standard hierarchy as set out in the BCIS Elemental Standard Form of Cost Analysis (SFCA). The update of the LCC models for CP3 aligned them to the 4th edition of the SFCA. The process of agreeing the final model hierarchy was an iterative process involving PF, HS1 Ltd and AMCL.

The asset hierarchy in the CP2 models was composed of four levels; Level 1, Level 2 and Level 3 were elements and sub-elements of the BCIS hierarchy and the fourth level was composed of components. For CP3, the asset hierarchy in the models was raised from component level to system level (Level 3) and assets were costed at this level. This will simplify the process of managing renewals for DfT and HS1 Ltd.

9.2.2. URN review

We developed a unique reference number (URN) system which reflects the BCIS hierarchy. This was applied to each line item in the station models and has also been adopted across the SASs and our supply chain facilities management systems (Concept for NR(HS) and Maximo for Mitie). The benefits are:

- Compliance with BCIS Elemental Standard Form of Cost Analysis;
- A consistent approach across the four station models;
- A consistent approach across HS1 Ltd and supply chain systems;
- Enables easier identification of assets requiring renewal;
- Each sub system is identified with renewal costs easily identified.
- Easy to check for double counting; and
- Provides an audit trail between models at each periodic review.

9.2.3. Renewal cycle review

PF reviewed the renewal cycles in the models with input from discipline specialists, HS1 Ltd, our supply chain and customers.

- Discipline specialists from PF and 4way Consulting undertook an assurance review of renewal cycles in the LCC models;
- NR(HS) and Mitie reviewed current condition and performance to identify works likely to be required within the next seven years (to the end of CP3). They engaged with their subcontractors for specific asset types and worked with us to ensure the Renewals Plan reflected the works identified;
- AMCL developed an initial asset criticality model (in the SAMP) through stakeholder engagement; and
- Train operators provided input into operational criticality for specific asset groups through review sessions.

This review recommended a number of changes to renewal cycles and identified a small number of omissions from the models; the LCC models were updated to take these into account. The most significant changes to the LCC models were:

- Changes for a small number of asset types as recommended by the discipline specialists, including;
    - Station communications systems updated to take into account the change from analogue to digital systems;
    - Specific core assets were more clearly identified as line items with the models rather than being included within other categories, for example, fire detection systems;

- Changing the approach to renewal of escalators, travelators and lifts. During CP2, we have observed greater wear than anticipated in PR14, largely as a result of environmental conditions, an increase in asset utilisation and changes in operational strategy. As a result, renewal of one escalator at Stratford International station was brought forward to CP2 and additional work on lifts, escalators and travelators across the HS1 stations will be needed in CP3. Following discussions with NR(HS), Mitie and their specialist subcontractors (Schindler and Coney) we changed our approach from full renewal every 25-35 years (depending on asset type) to in-truss renewal every 15 years and full renewal every 60 years.
- Additional items were added to the models, for example:
    - Brick renewals and repointing - the CP2 model had nothing before 2060, in the CP3 model costs there is an annual allowance which spreads these cost over time;
    - An asset management system for implementing the Common Data Environment (CDE) was added;
- Changes to take into account the NR(HS) and Mitie review of the CP3 workbank.

9.2.4. Life Cycle Cost review

9.2.4.1. Direct costs

PF employed Network Infrastructure Consultants to carry out a cost validation of the rates in the LCC models. This was a high-level cost review; costs were not assessed against detailed drawings or specifications.

The costs in the CP2 model were inflated to 2018 prices in line with RPI. Network Infrastructure Consultants then used the following sources to validate the cost estimates and recommend revised rates for each line item in the models:

- Network Infrastructure Consultants' cost database;
- Cost data from recently completed projects (the Thameslink Project, White Hart Lane station and London Underground stations); and
- Spons Architects and Builders price book.

For a small number of asset renewals, we provided PF with specific rates based on cost information from recent projects in the HS1 stations; these projects include lift and escalator renewals at Ashford International and the Station Communication Systems Renewal project.

9.2.4.2. On-costs

Network Infrastructure Consultants also reviewed the indirect cost rates in the LCC models (preliminaries, management fee, design, risk/contingency etc.). The categories of indirect costs and the percentages assumed in the LCC models were compared with seven other railway stations and the Network Infrastructure Consultants' internal database.

The conclusion was that in the main our allowances are consistent with the benchmarked range. The exceptions were that comparable programmes would include a risk allowance of 20-30% and that our allowance for main contractor preliminaries of 10% is lower than the benchmark average of 23%.

We discuss the risk and contingency issue in Section 10 (Long Term Charge).

9.3. Life Cycle Costs

This section sets out the calculated costs over the 40-year forecast period (2020 to 2060). Figure 9 shows the overall increase in costs between the PR14 forecast and the PR19 forecast.

Figure 9: Renewals costs to 2060, comparison with PR14 estimate

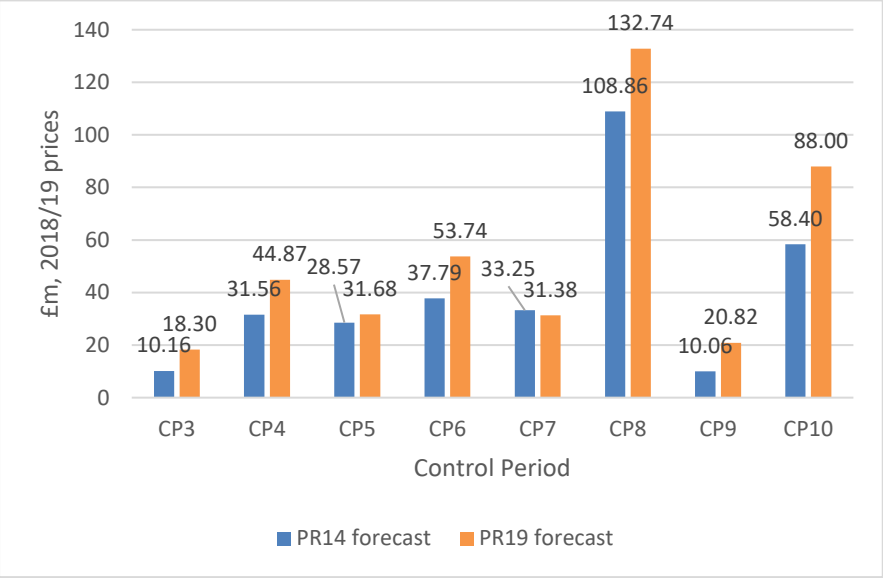


Table 17 below sets out the key renewal projects, by station and Control Period. This is consistent with the fact that a small number of asset categories account for the bulk of forecast spend across the 40-year horizon. The following list highlights the assets with major spend, provides an indicative sense of the proportion of spend (this varies slightly from station to station) and an indicative sense of how forecast spend in PR19 differs from that forecast in PR14:

- Communication systems: account for 21% of total spend. PR19 cost forecast is 18% higher than PR14 estimate.
- Lifts and Conveyor installations: account for 18% of spend. PR19 forecast is 77% higher than PR14.
- Roof: accounts for circa 9% of spend. PR19 forecast 17% higher than PR14.
- External Walls: account for circa 4% of spend. PR19 forecast is 33% higher than PR14.
- Windows and External Doors: account for 5% of spend. PR19 forecast is 3% higher than PR14.
- Wall Finishes: account for circa 4% of spend. PR19 forecast is 4% lower than PR14.
- Space Heating: accounts for circa 8% of spend. PR19 forecast is 35% higher than PR14.
- Electrical installations: account for 7% of spend. PR19 forecast is 15% lower than PR14.

Table 17: Significant renewals projects (over £1.5m) (2018/19 prices)

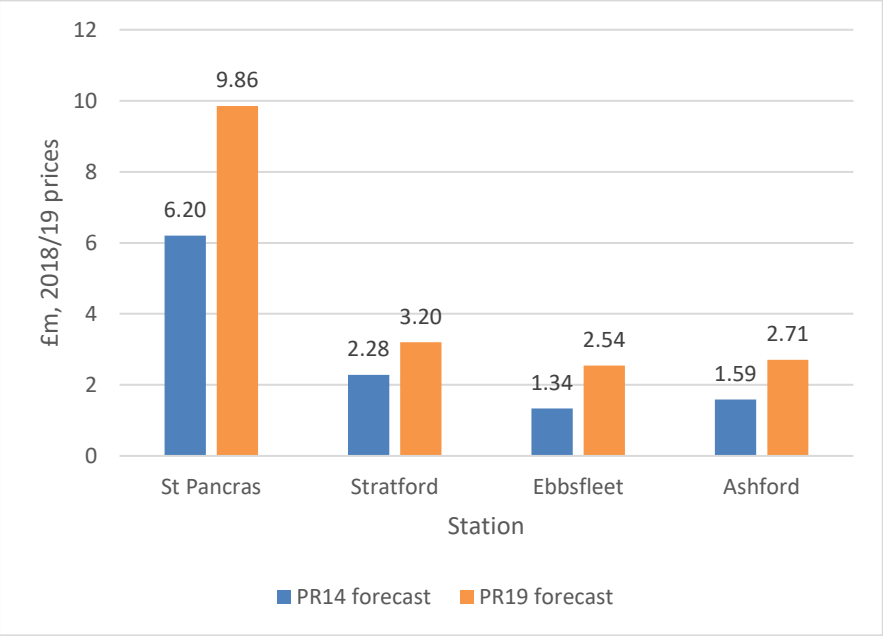
CP	Projects by station (cost estimate)	
CP4	St Pancras ▪ Space Heating (£2.2m) ▪ Lift and Conveyor (£6.4m) ▪ Communications (£15.3m) ▪ Special Installations (£4m) Ebbsfleet ▪ Lift and Conveyor (£2.3m) ▪ Communications (£2.5m)	Stratford ▪ Lift and Conveyor (£2.6m) ▪ Communications (£2m) Ashford ▪ N/A
CP5	St Pancras ▪ Lift and Conveyor (£6.8m) ▪ Communications (£8.1m) Ebbsfleet ▪ Electrical Installations (£1.7m)	Stratford ▪ Electrical Installations (£1.6m) Ashford ▪ N/A
CP6	St Pancras ▪ Disposal Installations (£1.6m) ▪ Heat Source (£2.4m) ▪ Space Heating (£4m) ▪ Lift and Conveyor (£5.6m) ▪ Fire and Lightning Protections (£6m) ▪ Communications (£8.8m) Ebbsfleet	Stratford ▪ Communications (£2.1m) Ashford ▪ Wall Finishes (£1.6m)

CP	Projects by station (cost estimate)	
	▪ Space Heating (£1.5m) ▪ Communications (£2.7m)	
CP7	St Pancras ▪ Roof (£2.6m) ▪ Space Heating (£5.9m) ▪ Electrical Installations (£1.7m) ▪ Life and Conveyor (£6.4m) Ebbsfleet ▪ Life and Conveyor (£2.7m)	Stratford ▪ Life and Conveyor (£2.6m) Ashford ▪ N/A
CP8	St Pancras ▪ Roof (£8.6m) ▪ External Walls (£4.2m) ▪ Windows and External Doors (£9.2m) ▪ Internal Walls and Partitions (£3.3m) ▪ Internal Doors (£2.3m) ▪ Wall Finishes (£13.7m) ▪ Ceiling Finishes (£7.1m) ▪ Disposal Installations (£2.4m) ▪ Water Installations (£1.6m) ▪ Space Heating (£2.1m) ▪ Ventilation Systems (£4m) ▪ Electrical Installations (£7.2m) ▪ Lift and Conveyor (£6.8m) ▪ Communications (£15.2m) ▪ Special Installations (£4m) Ebbsfleet ▪ Stairs (£2.8m) ▪ External Walls (£3.1m) ▪ Windows and External Doors (£2.5m) ▪ Communications (£2.5m)	Stratford ▪ External Walls (£3.6m) ▪ Windows and External Doors (£2.5m) ▪ Communications (£1.9m) Ashford ▪ Window and External Doors (£1.6m)
CP9	St Pancras ▪ Space Heating (£2.4m)	Stratford ▪ N/A
	▪ Lift and Conveyor (£5.6m) Ebbsfleet ▪ N/A	Ashford ▪ N/A
CP10	St Pancras ▪ Roof (£10.7m) ▪ External Walls (£3m) ▪ Floor Finishes (£4.1m) ▪ Space Heating (£1.6m) ▪ Electrical Installations (£7.8m) ▪ Lift and Conveyor (£6.4m) ▪ Communications (£17m) Ebbsfleet ▪ Roof (£4m) ▪ Electrical Installations (£1.7m) ▪ Lift and Conveyor (£2.3m) ▪ Communications (£2.4m)	Stratford ▪ Roof (£3.3m) ▪ Electrical Installations (£1.6m) ▪ Lift and Conveyor (£2.7m) ▪ Communications (£1.9m) Ashford ▪ N/A

9.4. Renewal activities and costs in CP3

This section outlines the specific works planned for CP3 and compares the current forecasts for each station with the forecasts made during PR14.

Figure 10: Change in CP3 renewals (PR19 v PR14)



The PR14 forecast of total CP3 expenditure across all four stations was £11.4m in 2018/19 prices (£10.2m in 2013/14 prices). In PR19 this is forecast to increase to £18.3m. The main reasons for the increase are:

- Removal of the efficiency overlay of 0.6% per annum compounded; and
- Change in the treatment of lifts and escalators.

Table 18: Significant renewals projects in CP3 (over £250k)

Station	Renewal
St Pancras	Floor Finishes ~£473k Fittings, Furniture and Equipment ~£335k Space Heating ~£2.6m Electrical Installations ~£576k Lift and Conveyor ~£5.6m
Stratford	Fittings, Furniture and Equipment ~£335k Space Heating ~£498k Lift and Conveyor ~£1.3m Communications ~£345k Special Installations ~£356k
Ebbsfleet	Fittings, Furniture and Equipment ~£335k Space Heating ~£643k Lift and Conveyor ~£836k Communications~£383k
Ashford	Fittings, Furniture and Equipment ~£335k Lift and Conveyor ~£1.1m Communications~£367k

9.5. Delivering efficiently

As detailed above, our projected costs have increased. These costs are based on available evidence, our improving asset knowledge, and independent review of the engineering approach. These costs form the basis of the LTC charges which are paid into the station escrow accounts to fund future renewals but the actual spend on a project at any point in time is subject to a further round of scrutiny from DfT. We must convince them that the proposed spend remains the best way of delivering the intended outputs.

Our overall aim is to deliver the right projects in a way that is value for money. The following aspects contribute to improved efficiency:

- Procurement approach: we are able to generate competitive tenders for work because we are able to harness facilities management suppliers, not just railway-focused companies. Our recent stations communications project also highlighted how we can best define the project scope in conjunction with operators.

- Project management / delivery capabilities: as described in the route 5YAMS we have substantially improved our project management capabilities, including how we generate and assess the options. Further improvements are planned.
- Relationship with suppliers: we continue to work hard with NR(HS) and Mitie to improve the clarity of accountabilities, and to incentivise the right outcomes.

While not part of this regulatory settlement, we recognise that total station charges paid by operators include LTC and Qx. We are separately engaging with operators about how we are challenging Qx and we are actively pursuing opportunities to balance renewals and Qx spend. For example, in the recent station communication systems renewal we have implemented a design that will minimise ongoing maintenance costs, and could facilitate moves to a single CCTV hub across stations which would reduce operations and maintenance costs.

9.6. Treatment of long-lived assets

The DfT has raised the issue of whether we should be collecting contributions now for 'long-lived' assets, where the renewals fall beyond the 2060 horizon required by the HS1 Lease. This would include, for example, the St Pancras International roof.

Not including such assets effectively under-funds the escrow account and may lead to cost shocks for operators in the future when the renewals fall within the scope of the review. However, the renewals are so far into the future that it is hard to generate a meaningful estimate of the costs, and it could present a challenge to train operator affordability.

There has been limited appetite to include such long-lived assets formally in the calculation at this point so we do not propose to do so. We will continue to keep this issue under review in PR24 and beyond.

To assist DfT in understanding the potential cost of renewals in the long term, we have developed a Shadow Model that looks forward 100 years. The Shadow Model is not a contractual requirement and does not form part of this periodic review; it will be provided separately to DfT.

Consultation responses on renewals plans

Stakeholders raised a number of questions and concerns about HS1's proposed renewal plans.

Scope of renewals plans

LSER questioned how HS1's passenger comfort Asset Management Objective was applied to stations renewals. This AMO informs our approach to investing in key station facilities, including seating, lifts and escalators, all of which support passenger comfort and (in the case of the latter) are now planned to be renewed more regularly.

LSER also suggested that repairs to lifts and escalators should be built into LTC, rather than Qx as currently. We note that the costs associated with these reactive repairs were previously moved from LTC to Qx in agreement with TOCs (through changes to Station Access Conditions) and PR19 did not revise the LTC/Qx classifications.

Efficiency targets

LSER considered HS1 should retain an efficiency overlay, in response to our view that the 0.6% overlay applied in CP2 should be removed. As noted in our proposals, the effect of the 0.6% efficiency overlay would be to remove 25% of the funding available for renewals in the long-term, which we do not consider to be sustainable.

The way we secure efficiency is by putting individual renewals projects to an open competition in the market, ensuring we get the best available rates and quality. Further, withdrawals from the escrow accounts to fund renewals require DfT sign-off, ensuring an additional level of oversight. We are concerned that imposing an efficiency overlay in this context would likely result in deferral of projects, with implications including increased Qx costs. Nevertheless, we wish to continue working with stakeholders to identify efficiency improvements that are deliverable and maintain the level of performance of our stations expected by operators and passengers.

Relationship to Qx

EIL raised concerns about HS1's station asset management and forecasting of Qx, arguing that LTC charges should be held at current levels until more effective management can be demonstrated.

In addition to the asset management improvements outlined in this submission, we note that we are working with operators and NR(HS) to provide more certainty over future Qx levels. As a starting point, in 2019/20 we have improved forecasting rigour, with NR(HS) now providing a Qx budget per period, by cost category (e.g. staff, maintenance, cleaning, utilities). This gives greater visibility to HS1 Ltd and TOCs to manage and challenge NR(HS) on the efficient delivery of operations and

Consultation responses on renewals plans
maintenance activity. This increasing forecasting maturity will enable us to develop a 5-year Qx forecast for the next best estimate process (later in 2019). In parallel, it is necessary to continue to appropriately fund LTC so that essential renewals activities are funded and the stations meet the performance standards expected by operators and passengers. As noted in Section 9.1, in PR14, it was agreed through the regulatory process that we would extend intervention cycles for most assets, to address LTC affordability concerns. We consider the impact of this has been to significantly increase reactive maintenance costs (for example, on lifts and escalators). The LCC model review for PR19 included a thorough review of all asset life cycles, which has resulted in increased renewals volumes and proposed LTC. The better operational performance expected from this renewals programme will reduce the costs associated with reactive maintenance interventions.

10. Long Term Charge (LTC)

10.1. Overview

The LCC for each station is converted into an annuity charge (LTC) to ensure escrow accounts are fully funded for all renewal activities over 40 years. The funds collected from the LTC are paid into a separate escrow account for each station.

The LTC is calculated for each operator by station. The annuity costs are allocated between operators based on two components:

- A fixed percentage as set out in the Station Access Conditions (SAC) reflecting the dedicated area used by that operator; and
- A share of the remaining costs (i.e. reflecting the common usage area) which is apportioned on the basis of each operator's share of vehicle departures.

10.2. Assumptions and methodology

The LTC model used in CP2 was signed off by DfT and we have therefore used the same model to calculate the LTC for CP3 with the following updates:

- Life cycle costs from the updated LCC models, as discussed in Section 9;
- LTC is calculated over 40 years from the start of CP3 (compared with 45 years from the start of CP2 in the previous model);
- Updated financial assumptions:
    - Inflation rate of 2.75%. This is based on the Bank of England forecast of 2.0% CPI and 75 to 100 bp between CPI and RPI; we have assumed the bottom of this range. This forecast is consistent with our internal forecasting principles.
    - For calculation of LTC, a discount rate of 5.1% nominal has been used based on our WACC.
    - We have assumed that 80% of escrow funds are placed in Authorised Investments and 20% remain in the escrow account.
    - Escrow interest rates, based on CP2 outputs:
        - For Authorised Investments 1.30%
        - For funds remaining in the escrow account 0%
        - For negative escrow account balances 5.1% is charged as a financing cost.

10.3. The basis of the LTC

Our proposal is that LTC is based on direct costs (e.g. plant, labour and materials), on-costs (e.g. project management) and indirect costs (risk and contingency allowance).

It is important that we set the LTC at the 'right' level, which ensures we collect sufficient money over time from operators to fund required station renewals over 40 years. Equally, we need to ensure we do not collect too much, as this will flow through to operators and potentially passengers in the form of higher costs.

We discussed the basis of our forecasts of direct and on-costs in Section 9. In this section, we explain our approach to indirect costs (risk and contingency), and how this informs our recommended LTC approach, as well as the alternatives set out for stakeholder consideration.

10.3.1.1. Indirect costs (risk and contingency)

We highlighted in our Stations LTC Review consultation that our station renewals plans did not include a risk / contingency element, and noted that our specialist cost consultants suggested an allowance of 20-30% could be considered. Stakeholders did not provide views on this figure in their consultation responses, and we have subsequently developed an approach based on specialist cost consultant advice, mindful of operators' affordability concerns.

This approach has identified appropriate risk and contingency bands by asset type over 10-year time horizons (which map to blocks of two Control Periods). Taking into account the mix of different asset types planned for renewal at each station, this leads to a risk and contingency allowance profile as set out in Table 19, below. These risk levels reflect the uncertainty over time associated with efficiencies in design criteria,

possible changes in standards, and risk due to different maintenance practices.

Table 19: Risk and contingency allowance profile

Station	CP3-4	CP5-6	CP7-8	CP9-10
St Pancras	15%	15%	10%	20%
Stratford	15%	15%	10%	5%
Ebbsfleet	10%	15%	10%	10%
Ashford	10%	10%	15%	10%

10.4. Proposed LTC for CP3

We consider it is prudent to apply these risk and contingency allowances to the base renewals costs (inclusive of on-costs), which drive the overall LTC charge. The risk and contingency levels we propose (as shown in Table 19) are generally significantly below the 20-30% originally suggested by our specialist cost consultants as standard in similar programmes.

We consider that including in the annuity both the full cost of delivering the works and a provision for risk and contingency is consistent with our HS1 Lease and Concession Agreement obligations. Specifically, it responds directly to the asset stewardship obligations under the HS1 Lease, and the need to keep (through appropriate funding) the stations in "good and substantial repair" at all times during the concession, including on handback to the government at the end of the concession.

The resulting LTC by operator and station is shown in Table 20. This represents a significant increase on CP2, and a further increase on the proposals we set out in the consultation which, as discussed earlier, were exclusive of a risk and contingency allowance.

Table 20: CP3 LTC by operator and station (£million, 2018/19 prices)

Station	EIL	LSER	EMT
St Pancras International	4.434	1.619	1.558
Stratford International	n/a	1.558	n/a
Ebbsfleet International	1.065	0.594	n/a
Ashford International	0.866	n/a	n/a
Total	6.365	3.771	1.558

Table 21 compares the proposed CP3 LTC by station with the CP2 LTC.

Table 21: CP3 v CP2 LTC (£million, 2018/19 prices)

Station	CP2 LTC	Removal of CP2 efficiency uplift	Other changes between CP2 and CP3	Proposed CP3 LTC
St Pancras	4.282	+0.771	+2.559	7.612
Stratford	0.770	+0.101	+0.687	1.558
Ebbsfleet	0.731	+0.191	+0.737	1.659
Ashford	0.763	+0.102	+0.001	0.866
Total	6.545	+1.165	+3.985	11.695

There is a total increase of £5.1m per annum (a 79% increase) across all four stations between CP2 and CP3 LTC. This is due to:

- An 18% increase from the removal of the CP2 efficiency overlay; and
- A 61% increase from other changes to the renewals programme, mainly bringing forward lift and escalator replacements and application of an appropriate risk and contingency allowance.

10.4.1.1. Alternative options

We recognise that the proposed LTC increases represent a significant affordability challenge for operators. Unlike the 'classic' network, we do not benefit from a network grant from Government, which would cushion the impact of the proposed increases faced by operators and potentially rail users.

Hence, we have assessed alternative LTC approaches, consistent with those being considered for the HS1 route, regulated by the ORR. These options are as follows:

- **Option 1** includes direct and on-costs over 40 years and applies the risk and contingency allowance over the first 10 years only.
- **Option 2** includes direct and on-costs and the risk and contingency allowance over only 20 years (rather than the 40 years in our recommended approach).

The way the different options include the risk and contingency allowance is shown in Table 22.

Table 22: Risk and contingency application by option

Station	CP3-4	CP5-6	CP7-8	CP9-10
St Pancras	15%	15%	10%	20%
Stratford	15%	15%	10%	5%
Ebbsfleet	10%	15%	10%	10%
Ashford	10%	10%	15%	10%
Application to LTC options	Applied to our proposed annuity			
	Applied to Option 1			
	Applied to Option 2			

Each of the options drives a different LTC level for CP3, over and above the current CP2 LTC, as presented in Table 23. For completeness, these options are shown alongside the 'direct and on-costs only' option which formed the basis of our consultation.

Table 23: CP3 v CP2 LTC (£million, 2018/19 prices)

Station	CP2	CP3 consultation	CP3 submission (and alternative options)		
	CP2 LTC	Direct and on-costs only	Base proposal	Option 1	Option 2
St Pancras	4.282	6.594	7.612	6.716	4.181
Stratford	0.770	1.415	1.558	1.442	0.861
Ebbsfleet	0.731	1.487	1.659	1.505	0.750
Ashford	0.763	0.767	0.866	0.777	0.870
Total	6.545	10.264	11.695	10.440	6.662
Increase from CP2	-	57%	79%	59%	2%

We are presenting these options to inform the debate with the DfT, train operators and other stakeholders. We would expect assurance from DfT that any move away from the current approach to long term asset renewals was consistent with the HS1 Lease and Concession Agreement.

We note that significant renewal of assets is expected to be necessary in CP8 (£133m in 2018/19 prices, compared to £18.6m forecast for renewals in CP3). This forecast renewal activity is heavily concentrated on St Pancras International station, reflecting the need to conduct major works on the roof, external walls and windows and other assets, four decades following the major refurbishment completed in 2007. We submit that any LTC approach needs to recognise this future funding challenge, for reasons of inter-generational equity (i.e. beneficiaries of the station infrastructure today should pay towards the longer-term costs of renewals). We have concerns that Option 2, above, fails to meet this test, and indeed our analysis suggests it would result in negative station escrow balances during CP8. However, we welcome the opportunity to discuss both our recommended approach and the alternative options further with stakeholders.

10.5. Structure of charges

The structure of charges refers to the methodology we use to allocate the annuity costs between operators. One of the challenges we have had is the contribution from retail to station-wide renewals. We consider that the current approach where retail does not contribute to LTC is appropriate:

- The primary purpose of the station is to provide passenger access to trains so it is appropriate that operators pay for renewals.
- Consistent with this approach, retailers pay all the direct costs associated with the retail units – these are **not** included as part of Qx and are paid by the retailers:
    - Business rates;
    - Utility bills;
    - Cleaning costs;
    - Retail unit fit-outs;
    - Share of BTP;
    - Share of wi-fi costs;
    - Cost of HS1 and NR(HS) staff dedicated to retail / commercial activity;
    - Waste disposal; and
    - Maintenance of the units.

The other major challenge has been about the Thameslink franchise not currently contributing to St Pancras International costs. Stakeholders have suggested that on a user-pays basis, the Thameslink franchise should contribute to these costs. As this was a point raised in the consultation, we set out our recommended approach below in our summary of stakeholder consultation responses.

Consultation responses on LTC

Affordability

The main stakeholder concern in relation to the LTC was affordability, which we have addressed in this submission by presenting alternative (lower cost) options for consideration.

LSER also questioned whether the annuity for stations is calculated on broadly the same basis as for route. We confirm this is the case; further, the options presented here to address affordability concerns are based on those presented in the route 5YAMS submission to the ORR.

Structure of charges

EIL emphasised the structure of charges at St Pancras particularly did not reflect the user-pays principle, owing to the fact that the Thameslink franchise does not contribute towards LTC and Qx, and retailers in the station do not fund LTC.

On the potential for a contribution by the Thameslink franchise, we acknowledge this would reduce the charges faced by other operators at the station. The limitation to date has been that there is no Station Access Agreement in place with the Thameslink franchise operator, and no ability to impose one on the franchisee. Ultimately, this change would require DfT approval, and we propose to advocate this change to the DfT, in conjunction with EIL and other station operators, as part of the specification of the next Thameslink franchise.

On station retailer contributions to LTC, we note, as above, that retailers pay all the direct costs associated with the retail units. Station renewals plans and funding are developed on the basis that the primary function of the station is to serve rail passengers, hence we think this allocation is fair and correct. It also underpins the funding model agreed as the basis for sale of the HS1 concession (unlike NRIL, HS1 is not set up on a 'single till' basis i.e. commercial revenues are not used to offset railway costs).

Consultation responses on LTC
Finally, there is a question about whether we should review the methodology for allocating costs between operators. As discussed during PR14, there may be better ways to allocate costs between operators than the percentages based on station space and share of vehicle departures. These are simple and well-known, but there may be other allocation metrics that would better represent the appropriate contribution to renewal costs. There has been limited appetite for a detailed review. We plan to revisit this issue as part of any transition to a contribution from the Thameslink franchise. This would represent a major change to the allocation between operators so it makes sense to consider the issues together.

Part 3: Stations Enhancements Framework

11. Stations enhancements framework

11.1. Introduction

The growth on HS1 and at our stations is a major success story, generating substantial benefits for customers, businesses, the regions we serve and the wider economy.

With this growth comes the need to invest in future capacity, amenity and facilities improvements at our stations, ensuring the passenger experience of HS1 remains excellent. We are committed to making these investments, including providing the upfront capital investment, where this is supported by appropriate commercial, legal and, where relevant, regulatory measures.

The purpose of this section is to outline our intended approach to stations enhancements, in recognition that both our Network Statement and Concession Agreement are silent on this topic at present, and there is a need for greater clarity on our approach.

11.2. Current approach and problem statement

At present, where the need for a station enhancement is identified, we conduct commercial negotiations with operators, aimed at reaching agreement on scope, cost, charging, risk allocation, and other key commercial terms. Generally, it is possible to agree such terms, and the station enhancement proceeds in accordance with a legal agreement between HS1 Ltd and the operator(s).

In certain circumstances, it may not be possible for HS1 Ltd and the operator(s) to reach a commercial agreement on a station enhancement, even where all parties recognise the need for an enhancement and agree the scope of works. This could be due to disagreement on the costs, charging (including any residual value at franchise or concession end) or allocation of risks, among other factors.

Under the current model, should it not be possible to reach a commercial agreement between HS1 Ltd and the operator(s), the investment will not proceed.

The other possible means of approving investment and setting charges – through a regulatory process – is not available to HS1 Ltd or the operator(s). This is because there is no provision for station enhancements in the Concession Agreement or HS1 Lease. In this way, stations enhancements are treated differently to route enhancements, which can be approved and charged for under the Specified Upgrade provisions in the Concession Agreement.

This brings with it the risk that, in the longer term, investment in stations enhancements is sub-optimal, resulting in a failure to meet passenger demand and expectations, and falling passenger satisfaction overall. As custodian of the HS1 assets, we are determined to ensure the quality of our stations and passengers' experience of them remains outstanding.

11.3. Proposed approach

Given the above, we consider it important that we set out our proposed approach to station enhancements, including:

- The principles we intend to apply to charging for station enhancement projects, based on work we have commissioned from Oxera;
- How we intend to address key commercial issues, including charging/payment structures, risk allocation, and dispute resolution; and
- Our approach to implementing station enhancement projects, specifically our position on any required changes to legal agreements or regulatory documents.

Broadly, our position is that the current legal and regulatory arrangements are fit for purpose for the types of station enhancement projects we and operators may wish to complete in the short to medium term.

However, we believe we can be clearer in our Network Statement about our policy on station enhancements, our approach, charging principles, approvals process, and how we would seek to resolve any disputes.

We intend is to consider stakeholder feedback on the issues discussed below and reflect this feedback in developing a stations enhancement policy for the Network Statement (which would be relatively detailed, akin

to our discount policy). We will then consult on these Network Statement changes as part of the suite of legal agreement and regulatory document changes needed prior to the commencement of CP3.

In the longer term, we recognise there may be a need to modify the Concession Agreement to institute a framework for stations akin to Specified Upgrades. The benefits of this approach include an independent assessment of the proposed enhancement to determine efficiency, a process for dispute resolution, and relative certainty over cost recovery and charging. This, however, would require changes to the Concession Agreement to be agreed by the Secretary of State.

11.4. Allocation and charging principles

In 2016 and 2018, we consulted with stakeholders on high-level stations enhancements principles. There was strong support for a beneficiary-pays approach.

To progress this in PR19, we engaged Oxera to set out a series of more detailed economic and commercial principles that would inform development of a station enhancements framework. Oxera's view of enhancement types and how these, in principle, drive certain benefits and charging allocations is shown below.

Table 24: Enhancement types and benefits / payment allocation

Enhancement type	Detail	Who benefits / pays
Service quality requested by operator	Typically for improved customer experience	Operator
Capacity enhancement	Increase in passenger numbers and/or trains	Operator and HS1 Ltd (split to be determined based on capacity benefits)
Composite	A combination of the two above	Need to isolate service quality and capacity benefits and allocate as above
Exogenous	Driven by new or increased government regulation (e.g. security)	Operators and HS1 Ltd (any pass through to passengers would require new charging mechanism)

We consider Oxera's proposed typology captures the relevant possible station enhancement types, and in principle would result in fair charging allocations, applying the beneficiary-pays principle.

A key challenge will be agreeing with operators the nature of the benefits produced by an individual station enhancement, and a fair allocation of costs between HS1 Ltd, operators – including current and future operators – and passengers. As we note below, we consider the multiple types of potential station enhancements lends itself to a case-by-case approach.

11.5. Addressing key commercial issues

In order to provide clarity on our approach, we intend that the stations enhancement policy in the Network Statement will set out our position on key commercial issues which would need to be resolved to secure investment.

At the same time, we recognise the value of flexibility, and working with operators to ensure the commercial arrangements governing station

enhancements are fit for purpose and meet the needs of all parties. With that in mind, our preference is for adopting bespoke, project-by-project approaches to key questions such as charging and risk allocation, informed by key principles.

Oxera has set out options for addressing certain key commercial issues, and these are shown below, alongside our initial views.

Table 25: Addressing key commercial issues

Issue	Oxera advice	HS1 Ltd position
Recovery of planning and design costs	▪ Capitalise into overall project costs and allocate per the typology above. ▪ Could also include some element of HS1 internal staff costs.	▪ We would seek to capitalise project-specific and, where applicable, HS1 internal costs into overall project costs and allocate to operators. ▪ These would be allocated based on identification of benefits and the typology above.
Construction costs and risks	▪ Typically, to be borne by HS1 Ltd. ▪ If the operator took on the risk of project overruns, HS1 cost of capital would decrease.	▪ Generally, HS1 Ltd is overall best-placed to manage these risks. ▪ We need to consider the impact on our cost of capital of any assumed risks (e.g. around the robustness of cost estimates), and the exposure of operators (if any) to cost overruns. ▪ These issues will be dealt with on a case-by-case basis.
Charging models	Variety of models possible: ▪ Pay as you go (straight pass through as incurred); ▪ One-off payment on handover; ▪ Annual or other periodic charges; ▪ Per passenger per train charges.	▪ There is value in a consistent approach, but we are open to adopting a bespoke charging model for each enhancement depending on its characteristics and benefits. ▪ Where HS1 Ltd provides the upfront capital, we will want to include measures to secure payback (including residual value).
Volume risk	▪ In capacity projects which HS1 Ltd funds, we are exposed to the risk that train paths committed to by operators are not taken up (i.e. forecast incremental IRC does not materialise). ▪ This would need to be reflected in a higher cost of capital or mitigated (e.g. through a take-or-pay contract).	▪ We recognise this is a significant risk and will need to be addressed in order to secure investment. ▪ As above, we are open to adopting a bespoke charging model for each enhancement. A key consideration will be how volume risk is managed and mitigated; this could include front-loading certain charges, a volume re-opener, and take-or-pay type contracts.
Exclusions	▪ There may be a level of station enhancement spend under which HS1 Ltd could choose not to apply the stations enhancement policy (and effectively absorb the costs).	▪ We recognise there may be certain smaller scale investments for which the stations enhancement policy, and the necessary commercial / legal agreements, may provide too much of an administrative burden for HS1 Ltd and operators. ▪ We will assess this on a case-by-case basis.

Issue	Oxera advice	HS1 Ltd position
Disputes	To manage disputes, a resolution process could involve: ▪ Referral to DfT / ORR; ▪ A standard industry arbitration forum; ▪ A bespoke model in which each party nominates its own arbitrator, who nominate a chair with a casting vote.	▪ We can see positives in each approach, and are interested in stakeholder views. ▪ We may choose to adopt a standard method for dispute resolution across all station enhancement projects.

11.6. Implementing a stations enhancements framework

While HS1 Ltd and operators have successfully agreed commercial arrangements for station enhancements in the past, we need to consider whether reliance on this approach is fit for purpose in the future.

As noted above, there is a risk that relying solely on commercial negotiation to secure investment in stations enhancements results in insufficient investment over time, leading to poor outcomes for passengers. The limitations of the commercial negotiation approach may include:

- Difficulty in resolving complex charging issues, particularly where there are multiple beneficiaries (some mix of HS1 Ltd, current and future operators, passengers);
- Inability to address impacts on the HS1 Concession that require Secretary of State approval (e.g. residual value at concession end); and
- Lack of provision for dealing with 'exogenous' drivers for the station enhancements e.g. where there is new government regulation and no commercial imperative for the operator to agree to the charges, but these charges should be allocated to passengers.

In recognition of these and other potential limitations, we consider two approaches to implementing our approach to stations enhancement are possible:

- Writing a stations enhancement policy for inclusion in the Network Statement, modifying our charging structure where necessary, and relying on existing agreements, amended as necessary (particularly the Station Access Conditions) to progress enhancements; and
- Doing the above AND seeking changes to our regulatory framework and legal agreements (e.g. the Concession Agreement), to put our ability to plan for, have approved and charge for enhancements on a more robust footing.

On balance, we are minded to work within the current legal and regulatory framework to secure station enhancements in the short-term, rather than advocate a specific regulatory regime (including in the Concession Agreement) at this time.

This approach has a number of benefits, including providing the opportunity to 'learn from experience' as we work with operators on specific station enhancements projects, informed by the initial charging and commercial principles outlined here and in future in the Network Statement.

Based on this experience, we may then wish to seek changes to the Concession Agreement, to apply a framework for station enhancements akin to the Specified Upgrades process for the HS1 route. This would be subject to the Secretary of State's approval.

Part 4: Next Steps

12. Next steps

For any queries in relation to this submission, please contact:

Andy Cole
Manager, Regulation and Customer Relationships, HS1 Ltd

Email: andy.cole@highspeed1.co.uk

The next steps on the Stations LTC Review are as follows:

Milestone	Date
DfT consultation on its proposed decision	June/July 2019
Any required alterations made to DfT decision in light of consultation responses	July/August 2019
Final DfT decision issued	By 31 August 2019
Implementation phase – Review Notices issued and adjustments made to regulatory documents: ▪ Station Access Conditions; ▪ Station Access Agreements; and ▪ HS1 Network Statement.	September to November 2019

The new charges and changes to our regulatory framework will take effect from 1 April 2020.

Part 5: Appendices

Appendix 1 Glossary/acronyms

AHU	Air Handling Unit
AMOs	Asset Management Objectives
BMS	Building Management System
BTP	British Transport Police
CCTV	Closed Circuit Television
CHW	Chilled water
CIS	Customer Information Systems
CP1	Control Period 1 (October 2009 to March 2015)
CP2	Control Period 2 (April 2015 to March 2020)
CP3	Control Period 3 (April 2020 to March 2025)
DfT	Department for Transport
EIL	Eurostar International Limited
EMT	East Midlands Trains
FWI	Fatalities and Weighted Injuries
GTR	Govia Thameslink Railway
IRC	Investment Recovery Charge
KPI	Key Performance Indicator
LSER	London & South Eastern Railway Limited
LCC	Life Cycle Cost
LTC	Long Term Charge
LTHW	Low temperature hot water
MEWP	Mobile elevating work platforms
NR(HS)	Network Rail (High Speed) Limited
NRIL	Network Rail Infrastructure Limited
NRPS	National Rail Passenger Survey
ORR	Office of Rail and Road
PR14	2014 Periodic Review of HS1
PR19	2019 Periodic Review of HS1
Qx	Qualifying expenditure
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
RM3	Risk Management Maturity Model
ROGS	Railways and Other Guided Transport Systems (Safety) 2006 (as amended)
RPI	Retail Price Index
RSSB	Rail Safety and Standards Board
SAA	Station Access Agreement
SAC	Station Access Conditions
SAMP	Strategic Asset Management Plan
SAS	Specific Asset Strategy
SCSR	Station Communications Systems Renewal
SDI	Systems Delivery Integrator
SMS	Station Management System
SoS	Secretary of State for Transport
TOC	Train Operating Company
UKBF	UK Border Force
UPS	Uninterruptible power supply
WLC	Whole life cost

Appendix 2 Supporting Documents

	DfT	All consultees
Strategic Asset Management Plan	✓	✓
Specific Asset Strategies for each asset type	✓	✓
HS1 Asset Management Policy	✓	
Station Life Cycle Reports (LCRs)	✓	
LTC model (which includes the LCC models for each of the four stations)	✓	

*Note: Supporting documents to be provided separately

Appendix 3 Consultation responses

This table summarises the feedback from stakeholders received by 10 April 2019, provides an HS1 Ltd response and shows where further detail can be found in this submission. The table also provides some initial feedback on the additional submission received from EIL on 17 May; our full response to EIL feedback will be addressed as part of the regulatory process set out by DfT in its letter of 25 April 2019.

#	Consultee	Topic	Consultee feedback	HS1 response	HS1 submission document reference
1	LSER	Renewals	The repair of lift and escalators assets is a CAPEX cost and should be amortised and funded through Long Term Charge not Qualifying Expenditure.	The reactive costs for lifts, escalators and travellators were previously removed from LTC / CAPEX and moved to Qx by changing the SACs which was completed in agreement with all TOCs. This change was in answer to making the LTC model a model for renewals only allowing the renewal of assets to be clearly costed.	Section 9
2	LSER	Efficiencies	We do not agree with the removal of the CP2 efficiency overlay. While the 0.6% p.a. applied in CP2 may have been arbitrary, this is not an argument for removing it altogether. HS1 should be challenging NR on efficiency, in the same way it has done for O&M costs.	The effect of the 0.6% efficiency overlay would be to remove 25% of the funding available for renewals in the long-term, which we do not consider to be sustainable. The way we secure efficiency is by putting individual renewals projects to an open competition on the market, ensuring we get the best available rates and quality. Further, spending from the escrow accounts requires DfT sign-off, ensuring an additional level of oversight. We are concerned that imposing an efficiency overlay in this context will likely result in deferral of projects, with implications including increased Qx costs, but welcome further discussions.	Section 9
3	LSER	LTC	The document does not clearly detail what assumptions have been made about efficiency, risk and delivery model in the calculation of the LTC forecast. This needs to be brought up to the same standard as the renewals forecasting in the 5YAMS.	This is made clearer in the final submission - we show the proposed LTC proposed with contingency over 40 years, and options including no contingency, 20-year funding and a buffer option (as for route). The delivery model is not anticipated to change for CP4 onwards.	Section 10
4	LSER	LTC	Is the annuity model for LTC the same as that adopted for Route? The read-across between	This is made clearer in the final submission, to be consistent with route.	Section 10

#	Consultee	Topic	Consultee feedback	HS1 response	HS1 submission document reference
			the two HS1 documents is not clear. LTC should target a zero escrow account balance by 2040, and avoid pre-funding costs related to the next concession while the IRC for this concession is still being paid off.		
5	LSER	Assumptions	How are CPI and the HS1 WACC applied in the annuity calculation?	CPI assumption is 2.75% as per route. The rate applied to negative escrow balances has been updated for consistency with route - i.e. WACC (5.1%).	Section 10
6	LSER	Assumptions	Escrow account interest rates should be re-forecast for CP3, rather than using CP2 outputs.	We have referenced implied GBP interest yield curves for a forward looking five-year period based on the Escrow Cash Management Strategy and using up to date yield curves as available at time of submission.	Section 10
7	LSER	Assumptions	Interest on negative escrow account balances should be charged at HS1 CoD rather than the WACC, in the same way that credit balances earn interest at the market rate rather than the HS1 WACC.	Negative escrow cash balances will require to be funded by credit facilities from banks or other third party funding, e.g. by shareholders. The funding of negative Escrow balances is most likely to occur in a period after the HS1 concession ends and because the funding structure of a successor concession holder cannot be known we have modelled using the current HS1 WACC. This allows us to make a reasonable working assumption of future funding costs that cannot be exactly ascertained. These assumptions can be refined in later control periods.	Section 10
8	LSER	Renewals	Renewal works funded by LTC were carried out to one of the main concourse escalators at Stratford within CP2 however they are not quantified within the table.	The Stratford escalator E3 that failed and was renewed in 2017/18 has been taken into account in the model.	Section 9
9	LSER	Renewals	The following sentence on page 32 needs to be elaborated on. What process will be used to ensure that these non service effecting assets are eventually replaced and not left in a failed state. A failed asset can lead to poor passenger perspective of the station which in	A failed asset will generally be repaired / renewed on a reactive basis as most all systems have a healthy asset life remaining condition survey which identifies when the renewal will be planned to be undertaken, plus there is a planned preventative maintenance	Section 8

#	Consultee	Topic	Consultee feedback	HS1 response	HS1 submission document reference
			turn can have a detrimental effect on NRPS results. To state that the delay of a renewal can be perceived as saving is incorrect. A delay should only occur if there is a service affecting asset that requires attention more urgently. *We will better understand how important the assets are. If the failure of an asset is unlikely to be service-affecting then we are likely to be able to replace later rather than earlier, saving money.*	plan covering all assets and systems. Delaying a renewal of an asset can be seen as a saving only if by extending the life of an asset by a significant amount of time removes an additional renewal intervention.	
10	LSER	Renewals	Can you please provide further information on what elements are included within 'Passenger Comfort' within Table 15? Is this based on station comfort, ride quality (lift & escalators) etc?	The AMO 'passenger comfort' for stations is interpreted as described generally as seating, ride quality lifts, escalators etc.	Section 8
11	LSER	Renewals	Table 16 details considerable investment in station heating throughout CP6. Southeastern would like to understand what is included within this scope.	The life cycle model identifies the renewal of the three main boilers and five main chillers plus some 30 plus DX cooling systems and c50 air handling systems including ancillary items such as FATVAV ceiling units.	Section 9
12	EIL	Relationship to Qx	There is a track record of poor forecasting - or, until recently, no forecasting at all — in relation to stations. Asset management has not been strong. In this context price increases of up to 238% (Ashford) are wholly unjustified. HS1 must demonstrate more accurate forecasting and understanding of station assets before any proper view can be formed. Eurostar's view is that no increase (0% nominal) should be permitted on stations charges unless and until HS1 has demonstrated effective management of these assets.	We recognise the need to improve Qx forecasting, and continue to work with NR(HS) and operators in this area. We are nevertheless confident that our renewals plans are robust and informed by sound evidence. We must ensure ongoing, appropriately-timed investment in renewals, without which we will face higher O&M due to reactive maintenance.	Section 9
13	EIL	Structure of charges	There are fundamental problems of cost allocation. Not only does this apply to the fact that there is no allocation to Thameslink but it particularly applies to the commercial estate. Last year HS1 earned an operating margin of	We agree that Thameslink operations at St Pancras should contribute towards LTC, and will work with EIL to make the case to the DfT for change (inclusion of Thameslink box in St Pancras/HS1 lease and charging	Sections 9 and 10

#	Consultee	Topic	Consultee feedback	HS1 response	HS1 submission document reference
			60% on its retail units yet these businesses make zero contribution to long term costs. This represents a cross subsidy from rail passengers and a fundamental misallocation of the rail funding envelope.	arrangements). Retailers pay all direct costs associated with their operations, and these are not included in Qx. This funding model reflects the structure of the HS1 Concession.	
14	KCC	Charges	KCC is concerned about the immediate and likely impact on the passenger fares and freight charges for users of HS1, and the negative effect on economic development in Kent, were these very high percentage increases to be charged from 2020 onwards. KCC would therefore wish to have a much clearer understanding of why these charges are likely to be so much higher than those which currently apply.	HS1 acknowledges the potential impact of proposed higher charges on operators and wider economic development in Kent, and hence sets out alternatives in our submission to address affordability concerns.	Sections 9 and 10