



Network Rail's consultation on regulated access charges in Control Period 7 (CP7)

11 November 2022

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1 Introduction and summary

- 1.1 The purpose of this consultation is to set out Network Rail's proposed approach to recalibrating its access charges as part of the 2023 Periodic Review process. Access charges are paid by all train operators - passenger, open access, freight and charter - which use Network Rail's infrastructure. At the start of each Control Period, access charges are recalibrated to ensure that Network Rail recovers its costs of maintaining, renewing and operating the network, and, in the case of electric traction, the cost of the delivery and supply of electricity. This consultation and the work on charges is taking place within the wider policy framework for access charges established by the Office of Rail and Road (ORR).
- 1.2 The methodologies and models used to calculate and recalibrate Network Rail's access charges are complex. While every effort has been made to make this consultation document as accessible as possible, it deals with technical aspects of charging and should be read in conjunction with [ORR's consultations \(July 2021 and April 2022\)](#) on Network Rail's access charges and their subsequent [conclusions](#) published in October 2022. Additionally, further supporting guidance and documentation on access charges can be found on Network Rail's [website](#) which may also prove useful.
- 1.3 Network Rail is seeking stakeholders' views on its proposed approach to recalibrating access charges and how it intends to implement ORR's conclusions for the following:
- a) Infrastructure Cost Charges (FTACs¹ and ICCs);
 - b) Variable Usage Charge (VUC) and bespoke charter operator charges;
 - c) Electricity Current for Traction (EC4T);
 - d) Electrification Asset Usage Charge (EAUC); and
 - e) Station Long Term Charge (LTC) and Qualifying Expenditure (QX) Management Fee for managed stations.
- 1.4 The Periodic Review process (PR23) for the next control period (CP7) takes place against a backdrop of ongoing industry reform and the planned creation of Great British Railways (GBR), which is expected to absorb Network Rail and its accountabilities. The timeline for the transition and the existing legal requirements governing access charging means ORR is required to continue as normal with its PR23 programme. While the two processes are separate (PR23 and Network Rail's transition into GBR), it is important that any proposed changes don't complicate the transition further. Network Rail has therefore continued to engage with the GBR Transition Team on ORR's access charges consultation and Network Rail's own consultation.

¹ Fixed Track Access Charges

- 1.5 On 20 October 2022, ORR published its [conclusions on Network Rail's charging framework²](#). ORR concluded that Network Rail's existing framework will be broadly retained in its current form, while making some incremental changes to ensure it remains fit for purpose in CP7. Network Rail is now required to implement ORR's policy conclusions. In addition, Network Rail is proposing some minor changes to methodology, consistent with ORR's conclusions.
- 1.6 This consultation focuses on Network Rail's proposed methodology for calculating access charges in CP7. The potential impact on the level of these charges, as a result of updating them to reflect PR23 cost data, is beyond the scope of this consultation. Network Rail will provide cost forecasts for CP7 that will take account of funders' High Level Output Specifications (HLOSs) and Statements of Funds Available (SoFAs) - as part of its Strategic Business Plans, expected in Spring 2023, at which point it will be possible to assess the impacts of the proposals in this consultation. Network Rail will use existing engagement channels to keep stakeholders updated on this work.
- 1.7 Network Rail appreciates that stakeholders will want to understand the impact that incorporating PR23 cost data, along with any proposed change to methodology, will have on the level of access charges they pay. To address this, and in the interests of transparency, Network Rail is planning to publish draft CP7 price lists in May 2023 in conjunction with its conclusions to this consultation, using draft PR23 costs. This will be in addition to publishing further draft price lists following ORR's Draft Determination.
- 1.8 ORR will, ultimately, determine the level and structure of charges for CP7 in its Final Determination, due to be published in October 2023.
- 1.9 Table 1 illustrates Network Rail's income from access charges in 2021/22.

Table 1: Income from access charges 2021/22

Charge / Network Grant		What does it recover?	Who pays?	2021/22 Income £m
Network Grant		Network Rail's minimum fixed costs and some traffic avoidable costs	Funders	5,199
Fixed charges	Fixed Track Access Charge (FTAC)	The income required to meet Network Rail's Net Revenue Requirement (after Network Grant and other income has been accounted for).	Franchised (/concession-style) passenger operators Ultimately a pass-through to funders.	1,294
	Infrastructure Cost Charge (ICC)	A proportion of fixed network costs as determined by ORR.	Open Access and Freight Operators, in limited circumstances	
Variable charges	Variable Usage Charge (VUC)	Maintenance and renewal costs that vary with network traffic.	All operators	275
	Electric Current for Traction (EC4T)	Costs of supplying electricity for traction.	All operators running electric vehicles	482
	Electrification Asset Usage Charge (EAUC)	Maintenance and renewal costs associated with electrification assets that vary with traffic.	All operators running electric vehicles	20
Stations charges	Stations Long Term Charge (LTC)	Maintenance, renewal and repair costs for each station that Network Rail owns.	All passenger operators at NR-owned stations	251

² "PR23 – Review of Network Rail's access charges – Conclusions on charging framework"

Infrastructure Cost Charges (FTACs and ICCs)

- 1.10 As determined by ORR in its October 2022 conclusions document, no major changes to the methodology have been proposed for CP7. Fixed Track Access Charges (FTACs) will still be levied on specified passenger operators and there will be a continuation of Infrastructure Cost Charges (ICCs) levied on Open Access Operators' interurban services and some freight services.
- 1.11 ORR has determined that the FTAC wash-up mechanism will be removed for CP7.
- 1.12 Network Rail is proposing a minor change to simplify its fixed cost model by adopting a more direct approach to allocating costs between the various geographical sections.

Variable Usage Charge (VUC) and bespoke charter operator charges

- 1.13 As determined in ORR's October 2022 conclusions document, the current structure of VUC, as intended at CP6, will be retained for CP7. Consistent with this, Network Rail will calculate operators' CP7 VUC rates using the same methodology that was used to calculate charges for CP6.
- 1.14 ORR determined that the existing VUC phasing-in policy will be retained such that the VUC for freight and charter operators³ continue to reach full cost reflectivity in the final year of CP7⁴. Additionally, during CP7, if there is an unanticipated requirement to downgrade the Route Availability to lower than Heavy Axle Weight (RA10), operators will be allowed to modify VUC rates in so far as the downgrade has a direct effect on vehicle operating characteristics.
- 1.15 To rationalise the published price list and improve its usability, Network Rail proposes the removal of some Zero Mileage vehicles from the CP7 price list.
- 1.16 Network Rail also proposes that following the introduction of a new vehicle⁵ which has been charged the Default VUC Rate, any rebate of charges will be limited to the start of the financial year in which the new VUC rate is agreed.
- 1.17 Lastly, Network Rail proposes a simplification of the steam slot charge for charter operators which would see the existing two charges replaced by a single steam slot charge.

³ VUC phasing-in also applies to North Yorkshire Moors Railway, who are classed as an Open Access Operator.

⁴ Subject to a review by ORR of the new cost-reflective VUC rates following Network Rail's recalibration for PR23.

⁵ This proposal also applies to modified vehicles where they have been charged a higher un-modified rate.

Electricity Current for Traction (EC4T)

- 1.18 As determined by ORR in its October 2022 conclusions document, several reforms are outlined aimed at improving the uptake in on-train metering and simplifying the charging framework more generally. These include the removal of Modelled Consumption Rates for new train services, the removal of Partial Fleet Metering and the removal of the Loss Incentive Mechanism.
- 1.19 In conjunction with recalibrating Default Consumption Rates for passenger operators and consistent with the ORR's approach to EC4T generally, Network Rail proposes the removal of Generic Consumption Rates for passenger operators and the introduction of Default Consumption Rates for freight operators in place of the Generic Consumption Rates.

Electric Asset Usage Charge (EAUC)

- 1.20 ORR confirmed in its October 2022 conclusions document that the current structure of the EAUC will be retained for CP7. Consistent with this, Network Rail will calculate operators' CP7 EAUC rates using the same methodology as was used to calculate rates in CP6.

Station Long Term Charge (LTC)

- 1.21 ORR confirmed in its October 2022 conclusions documents that the following changes should be made to the LTC charging methodology:
- a) A change in the classification of stations which is used to determine which of the two LTC calculation methodologies⁶ applies at each station. The classification metric would move from managed or franchised status to station size.
 - b) An extension of the discount period for the operational property element of the LTC to a total of 5 years from the date of the station opening⁷, regardless of control period end and start dates.
- 1.22 In addition to the above, and following a change to Network Rail's operating model during CP6, the category average LTC calculation for CP7 will reflect the move from a route-based to a new regional-based structure.

Responding to this consultation

- 1.23 Network Rail requests responses to this consultation by 03 February 2023. Responses should be sent to nicholas.prag@networkrail.co.uk.
- 1.24 The questions posed as part of this consultation are summarised in Chapter 7 of this document.

⁶ Station specific or category average.

⁷ Instead of from the date of opening to the date of the end of the control period in which the station opened, which is the current methodology.

- 1.25 Network Rail will publish responses to this consultation on its website. Therefore if you consider any part of your response to be confidential, please state this clearly and provide a non-confidential version to be published.

Timeline and next steps

- 1.26 This consultation provides stakeholders and users of Network Rail's infrastructure an opportunity to respond to Network Rail's proposed access charging methodology for CP7. Key milestones are summarised in Table 2. Due to potential change in the PR23 timeline and process, it is possible that this may be subject to change.

Table 2: Key milestones

Key milestone	Summary	Date
Network Rail's Strategic Business Plan (SBP)	Publication on Network Rail's CP7 business plan including cost forecasts	Spring 2023
Network Rail's conclusions to its consultation on regulated access charges	Network Rail's conclusions on its proposed charging methodology for CP7, including a draft price list.	May 2023
ORR Draft Determination	ORR's views on outstanding charging issues (including proposals for level of ICCs) and the conclusions of Network Rail's recalibration exercise	June 2023
CP7 Draft price lists	Publication of draft price lists for all charges by Network Rail, consistent with ORR Draft Determination	July 2023
ORR Final Determination	ORR's final view on structure and level of all charges	October 2023
Review Notices and final CP7 price lists	Publication of Review Notices by ORR, confirming changes to track access contracts for CP7 Publication of final price lists by Network Rail, consistent with Final Determination	December 2023

2 Infrastructure Cost Charges (FTACs and ICCs)

Purpose and structure of the chapter

- 2.1 The purpose of this chapter is to set out Network Rail's proposed approach to Fixed Track Access Charges (FTACs) and Infrastructure Cost Charges (ICCs) in CP7 and seek stakeholders' views on its proposals. The remainder of this chapter is structured as follows:
- a) Summary of Network Rail's proposals;
 - b) Background; and
 - c) Proposed approach for CP7.

Summary of Network Rail's proposals

- 2.2 Given the significant work undertaken at PR18, and as determined in ORR's October 2022 conclusions, no major changes will be made to the methodology for allocating traffic-avoidable fixed costs to operators. More specifically, ORR's conclusions are as follows:
- a) The continuation of Fixed Track Access Charges (FTACs) for those specified passenger operators listed in Appendix 1;
 - b) The continuation of Infrastructure Cost Charges (ICCs) levied on Open Access Operators' interurban services;
 - c) The continuation of ICCs levied on freight services⁸ carrying, iron ore; spent nuclear fuel; ESI biomass; and ESI coal; and
 - d) The removal of the FTAC wash-up mechanism for CP7.
- 2.3 In addition, Network Rail is proposing the following:
- a) a **minor change** to simplify Network Rail's fixed cost allocation model.
- 2.4 Network Rail considers that all operators should contribute to the recovery of the long-run traffic-avoidable fixed costs that they cause on the network, where they are able to do so. Network Rail therefore support the retention of Infrastructure Cost Charges (ICCs) for freight and open access operators, subject to the ORR's market-can-bear tests.
- 2.5 Network Rail has reviewed stakeholder's responses to both [ORR's July 2021 and April 2022](#) consultations on Network Rail's access charges and notes that of those that responded, numerous operators would welcome greater transparency in relation to the fixed costs allocation process. ORR plans to address this by clearly setting out the relationship between fixed cost allocations, FTAC, and grant funding.

⁸ ORR will confirm its decision to retain the ICC for ESI Coal later in PR23.

- 2.6 Network Rail acknowledges that the consensus amongst operators is that they agree with using Network Rail's existing allocation methodology as the basis for allocating fixed costs in CP7, albeit this was caveated by some operators who shared the view that the existing methodology is complex and could stand to be simplified. Considering previous stakeholder engagement and reflective of these views, Network Rail is proposing a **minor change** to simplify the fixed costs allocation model, by adopting a more direct approach to allocating costs between the various geographical sections of the network.
- 2.7 The proposed minor change to the fixed costs model will greatly reduce the size and complexity of the model, which in turn will improve its useability and transparency while reducing the potential for mathematical errors and making assurance more robust, with minimal impact to operators FTACs.
- 2.8 The model estimates the maximum allocation of fixed costs to **all** operators on the network. ORR will use this information to determine the level of FTAC applicable to specified / passenger operators, or, in the case of freight and open access operators, it will use it in conjunction with its market-can-bear analysis to determine the level of ICC to be applied, if any.

Background

Purpose of Fixed Track Access Charges (FTACs) and Infrastructure Cost Charges (ICCs)

- 2.9 The purpose of Fixed Track Access Charges (FTACs) and Infrastructure Cost Charges (ICCs) are to recover a contribution towards Network Rail's traffic-avoidable fixed network costs, i.e. those which do not vary in the short term. FTACs are paid by specified operators⁹ while ICCs are levied against freight and open access operators only where the ORR's market-can-bear analysis determines they can afford a contribution. In 2021/22 Network Rail received £1,294m of income through both the FTAC and ICC.

Network Rail's fixed cost model

- 2.10 Prior to CP6, the methodology for allocating operators' share of Network Rail's avoidable fixed costs was not done on a consistent basis, with various different approaches in use¹⁰. This meant that it was not possible to make meaningful like-for-like comparisons between different types of services.
- 2.11 As part of the PR18 process, Network Rail commissioned an independent expert, Brockley Consulting, to carry out an extensive review of the cost allocation methodology which underpins the FTACs and suggest improvements. Brockley Consulting developed a different approach and rebuilt the model accordingly. At PR18 ORR concluded that Network Rail should adopt the developed approach and the Brockley Consulting model, for CP6.

⁹ Operators that are commissioned by funders and other devolved rail authorities to provide passenger services.

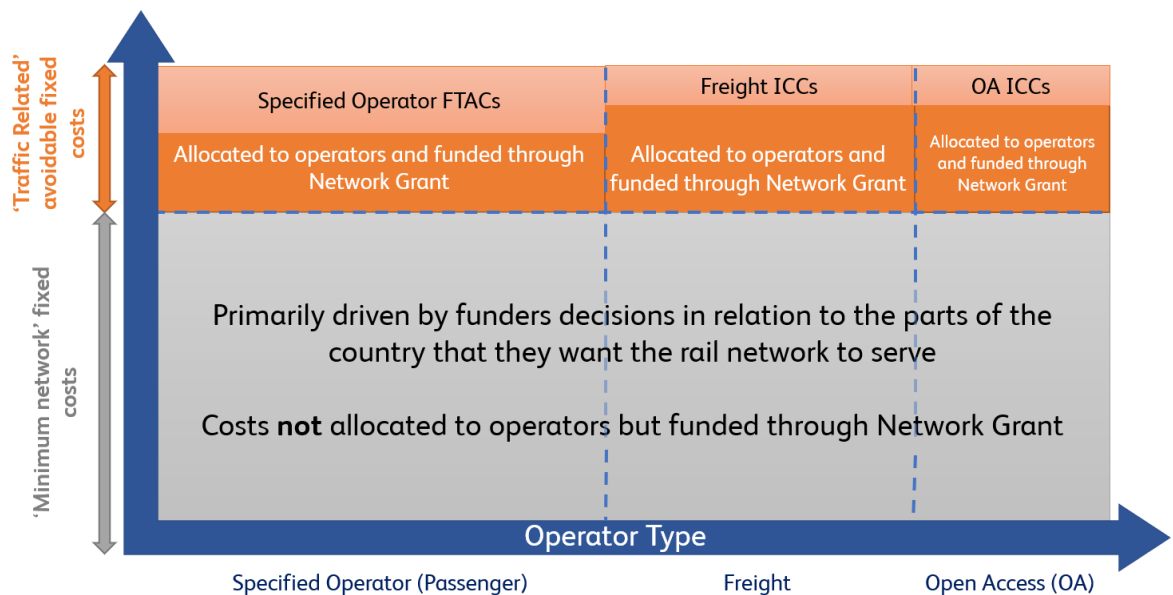
¹⁰ More detail contained in '[Network Rails consultation on its methodology for allocating fixed costs to train operators in Control Period 6](#)'.

- 2.12 The Brockley Consulting model, now referred to as the ‘**Network Rail fixed cost model**’, is used to estimate an operator’s maximum allocation of traffic-avoidable fixed costs¹¹. For this purpose, Network Rail’s fixed costs are categorised as follows:
- a) Traffic-avoidable fixed costs which could potentially be avoided in the long-run at lower traffic levels; or
 - b) ‘Minimum network’ fixed costs which are not possible to avoid in the long-run at lower traffic levels, assuming the same parts of the country continue to be connected to the rail network with a minimal network capability.
- 2.13 The fixed costs associated with having a ‘minimum network’ (which connects the different parts of the country to the rail network) are allocated to funders, rather than train operators. This reflects the fact that funders are largely responsible for specifying those locations connected to the rail network, through the franchising process and wider Government policy.
- 2.14 In simplistic terms, the current Network Rail fixed cost model estimates an operator’s maximum allocation of traffic-avoidable fixed costs by:
- a) Estimating the traffic-avoidable costs of individual geographical track sections, and then allocating the costs of each section to the operators that use that section, using traffic forecasts; and
 - b) Adjusting a) to exclude variable charges and third-party income.
- 2.15 FTACs are then calculated by ‘adjusting’ the maximum-allocation of traffic-avoidable fixed costs to reflect Network Grant funding and further adjusting this to reflect funding arrangements in place between Transport Scotland and Department for Transport.¹²
- 2.16 The diagram in Figure 1 illustrates this approach. Consistent with ORR’s conclusions, Network Rail will retain this method in CP7, and:
- a) **Only allocate traffic related avoidable fixed costs to train operators.** These costs are shown in orange in the diagram below, and will either be funded through fixed cost charges (FTACs and ICCs) payable by train operators, or Network Grant income which Network Rail receives directly from funders.
 - b) **Not allocate minimum network fixed costs to train operators.** These costs are shown in grey in the diagram, below. These costs do not vary, even over a long period of time, if more or fewer trains run on the network. In CP7 these costs are expected to be funded through Network Grant income which Network Rail receive directly from funders.

¹¹ An operator’s ‘maximum allocation of traffic-avoidable fixed costs’ are the maximum avoidable fixed costs estimated, **less** variable charges and third-party income but **does not** include an adjustment for Network Grant.

¹² Network Rail will continue not to allocate any of the fixed costs of the Scotland route to train operators with franchises specified by DfT, or allocate any of the fixed costs associated with England and Wales to franchises specified by TS.

Figure 1: Allocation of fixed costs and Network Grant.



- 2.17 While it is ultimately for the ORR to decide the level of FTACs for each operator, it is anticipated that the ORR will apportion traffic-avoidable fixed costs for specified operators in line with the outputs from Network Rail's fixed cost model.
- 2.18 For freight and open access operators, the maximum allocation of traffic-avoidable fixed costs determined by the model will be used to help inform ORR's market-can-bear analysis. Where ORR deems that either a freight or open access operator can bear an ICC, the value produced by the model will provide guidance as to the ceiling of that ICC.

ORR's view of fixed costs (Infrastructure Cost Charges) at PR23

- 2.19 As part of PR23, ORR conducted two consultations in relation to ICCs as part of its wider consultations on Network Rail's access charges. Its ['Initial Proposals'](#) consultation was published in July 2021 followed by a ['Further Proposals'](#) consultation in April 2022. ORR's views were consistent across the two consultations in that:
- It proposed that Network Rail's existing cost allocation methodology remains an appropriate basis on which to allocate fixed costs to operators; and
 - It was supportive of Network Rail's proposal to simplify its fixed cost model methodology, assuming it does not result in a material loss of transparency or a less fair allocation of fixed costs.
- 2.20 ORR confirmed these positions in its October 2022 conclusions on Network Rail's access charges.

Proposed approach to CP7

- 2.21 Network Rail agrees that given the significant work undertaken at PR18, no major changes should be made to the methodology for allocating traffic-avoidable fixed costs to operators.
- 2.22 However, Network Rail is proposing one minor change to its fixed cost model and the underpinning methodology with the intention of simplifying the size and complexity of the model without materially affecting the accuracy of the fixed cost allocation. This would be achieved by adopting a more direct approach to allocating costs between the various geographical sections of the network.
- 2.23 The change will greatly reduce the size and complexity of Network Rail's fixed cost model which in turn will improve its useability and transparency¹³ while reducing the potential for mathematical errors and making assurance more robust.

Proposed simplification to avoidable fixed cost allocation methodology

- 2.24 The PR18 version of Network Rail's fixed cost model is highly complex and constitutes a 95MB Excel file.
- 2.25 At PR18, the focus of the model's development was on testing and establishing a fundamentally different allocation methodology. At this point, complexity was accepted in an effort to accommodate a range of detailed suggestions in order to maintain focus on the credibility and robustness of the overall methodology, rather than debate the materiality of every detailed suggestion.
- 2.26 This resulted in a model that is complex - it incorporates some elements of complexity whose costs outweigh their benefits (in terms of modelling efforts). The Periodic Review process presents the appropriate opportunity to examine that issue. Network Rail does not consider that it should retain the complexities of a model if the future benefits of its simplification outweigh the costs of retaining those complexities, even if some minor accuracy were to be lost as a result.
- 2.27 Simplification of the model would bring significant benefits:
- a) A simpler model would be easier for stakeholders to understand and engage with, enhancing the effectiveness of stakeholder engagement. This could lead to further insights from stakeholders previously unlikely to be forthcoming, which could lead to future reforms and further improvements to the process and methodology;
 - b) Making any changes to the PR18 model is time consuming to update and test due to its complexity and volume of calculations which underpin the methodology. This limits Network Rail's ability to improve the model by responding to new information and suggestions.

¹³ Increased transparency was a feature of a number of operators' responses to the ORR's PR23 consultations on Network Rail's access charges.

- c) Recalibration of the model at PR23 will require a large number of re-runs, as different inputs are adjusted at different times. Experience from PR18 suggests this will be a labour-intensive process, limiting the agility with which Network Rail can reflect changes to inputs;
- d) Network Rail has started to use the model internally to bring greater transparency to the costs of specific sections of the network. This tends to require minor modifications to the front end of the model in order to analyse and summarise allocations in the appropriate way. A simpler, faster model would reduce the effort involved in such exercises and encourage more frequent application of the model, improving Network Rail's understanding of the cost of different parts of the network, with the potential for efficiency benefits; and
- e) Model assurance would be more robust.

Detail of proposed fixed cost model simplification and impact

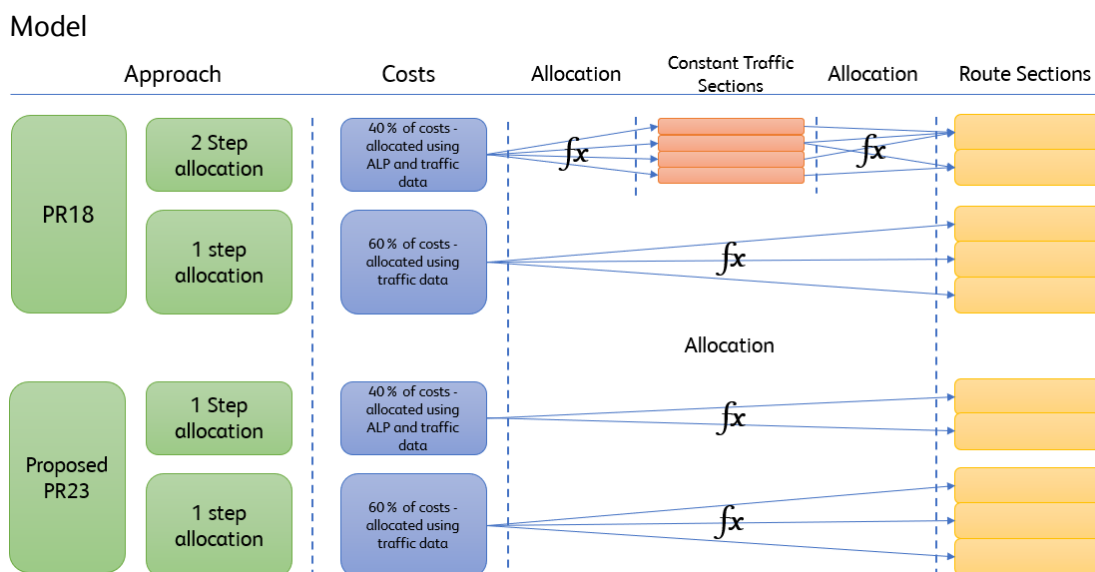
2.28 The proposed simplification to Network Rail's fixed cost model relates to the allocation of costs to over c3,000 Constant Traffic Sections¹⁴ (CTSs) and around 1,900 Route Sections (RSs). **The PR18 model** uses a two-step process for Asset Lifecycle Profiles (ALPs) based allocations and is a major source of complexity in the model. It allocates:

- a) around 40 % of costs (track, earthworks, bridges, signalling) to CTSs based on CTS specific data on ALPs and traffic, before then mapping the cost of each CTS to its corresponding RS; and
- b) the remaining 60 % of costs, where CTS specific ALP data is not available, directly to RSs.

2.29 For CP7, Network Rail is proposing to allocate the 40 % of costs currently allocated as described in 2.28 (a) directly to RSs. Figure 2 illustrates the different approaches.

¹⁴ Constant Traffic Sections are sections of the network which contain constant train counts (i.e. trains do not enter or leave a CTS between its boundaries)

Figure 2 – Proposed simplification of Network Rail's fixed cost model



- 2.30 Both the PR18 approach and the proposed (simplified) PR23 approach are valid, and it's not obvious that either is less accurate. However, the proposed PR23 approach results in a much simpler model. Network Rail has created a version of the model featuring this simplification and confirm that it considerably improves the model's usability by improving navigation and reducing the loading and run time of the model.
- 2.31 The impact of the simplifications on specified operators' avoidable fixed cost allocations is modest. A detailed table is contained in Appendix 2, but in broad terms:
- 13 out of 20 operators see a change of 1 % or less;
 - 5 operators see a change of between 1 % and 2 %; and
 - the remaining 2 operators see a change of 2.5 % and 3.7 %.
- 2.32 Avoidable fixed cost allocations give important signals as to the incidence of long run costs. However, such signals tend to be relatively broad brush - a change to fixed cost allocations of less than 3.7 % is highly unlikely to have a meaningful impact on industry decision making. Furthermore, given the pass-through nature of FTACs, specified operators are likely not exposed to any small fluctuations in the accuracy of the model outputs. Unlike variable charges, once set, the amount paid through FTACs remains for the entirety of the control period, regardless of industry outcomes. This contrasts with charges such as the Variable Usage Charge, which arguably do have a marginal impact on rolling stock procurement and usage. Therefore, the value of having a highly complex and highly accurate model for fixed cost allocations seems limited.

Question 1: Do you agree with Network Rail's proposal to simplify its fixed cost model? If not, please provide a detailed justification.

Indexation

2.33 Infrastructure Cost Charges will be subject to indexation by CPI annually, consistent with the approach taken in CP6 and consistent with ORR's conclusions.

3 Variable Usage Charge (VUC) and bespoke charter operator charges

Purpose and structure of the chapter

- 3.1 The purpose of this chapter is to set out Network Rail's proposed approach to re-calibrating the Variable Usage Charge (VUC) and bespoke charter charges for CP7, and seek stakeholders' views on this approach. As well as focusing on the methodology for allocating VUC costs to passenger and freight railway vehicles it will also focus on aspects of charter slot charges.
- 3.2 The remainder of this chapter is structured as follows:
- a) Summary of Network Rail's proposals;
 - b) Background;
 - c) Proposed approach for CP7;
 - d) Proposed areas for review in advance of the next review of charges;
 - e) Charter operators and North Yorkshire Moors Railway; and
 - f) Charter slot and cancellation charges.

Summary of proposals

- 3.3 As determined in ORR's October 2022 conclusions document, the current structure of VUC, as intended at CP6, will be retained for CP7. Consistent with this, Network Rail will calculate operators' CP7 VUC rates using the same methodology as was used to calculate charges for CP6.
- 3.4 More specifically, ORR concluded that:
- a) Cost categories included within the VUC calculation would not be changed;
 - b) There will be no changes to the underlying track damage formulae used to calculate VUC rates;
 - c) The existing VUC phasing-in policy will be retained such that the VUC for freight and charter operators¹⁵ continues to reach full cost reflectivity in the final year of CP7 subject to a review by ORR of the new cost-reflective VUC rates following Network Rail's recalibration for PR23; and

¹⁵ VUC phasing-in also applies to North Yorkshire Moors Railway, who are classed as an Open Access Operator.



- d) During CP7, if there is an unanticipated requirement to downgrade the Route Availability to lower than Heavy Axle Weight (RA10), operators will be allowed to modify VUC rates in so far as the downgrade has a direct effect on vehicle operating characteristics.
- 3.5 Having given consideration to stakeholders' responses to ORR's consultations, and issues that have arisen during the control period and the review process generally, Network Rail is consulting on the following proposals and minor changes to the recalibration of the VUC for CP7:
- a) The removal of some Zero Mileage¹⁶ vehicles from the CP7 price list;
 - b) Recalibration of Default VUC Rates for passenger and freight operators;
 - c) Following the introduction of a new vehicle¹⁷ which has been charged the Default VUC Rate, any refund of charges will be limited to the start of the financial year in which the new vehicle VUC rate is agreed; and
 - d) The simplification of the steam slot charge for charter operators.
- 3.6 In response to ORR's conclusions and the Periodic Review process generally, in advance of CP7, Network Rail is considering making various updates¹⁸ to the [VUC guidance](#) document published on its website. Network Rail will provide an update on this in due course.
- 3.7 Network Rail has reviewed stakeholders' responses to both [ORR's July 2021 and April 2022](#) consultations on Network Rail's access charges. Several stakeholders commented on the complexity of the VUC calculations and requested greater transparency with the addition of a step-by-step guide. In response, Network Rail has published VUC guidance alongside this consultation (see Appendix 3), which will be published on its website as a standalone document. Others noted that the provision of an updated VUC calculator with the ability to easily model different scenarios would be advantageous – which Network Rail published in April 2022¹⁹.

Background

Purpose of the Variable Usage Charge (VUC)

- 3.8 The purpose of the VUC is to recover the track, civils and signalling 'wear and tear' costs that Network Rail incurs when trains run on the network. The charge is paid by all operators (i.e. franchised passenger, freight, open access and charter operators) and in 2021/22 Network Rail received £275m of income through the charge.

¹⁶ Zero Mileage means any vehicle on the CP6 price list which has not recorded any mileage in Network Rail's Track Access Billing System over the last 6 years and where, in the case of freight wagons, the wagon has recorded Zero Mileage in both the Laden and Un-laden states since this time.

¹⁷ This proposal also applies to modified vehicles where they have been charged a higher un-modified rate.

¹⁸ For example, defining what constitutes a 'vehicle modification' or reopening VUCs impacted by the withdrawal of HAW capability during the Control Period.

¹⁹ [Link to the Passenger VUCs ready reckoner \(April 2022\)](#)
[Link to the Freight VUC ready reckoner \(April 2022\)](#)

- 3.9 The VUC is calculated on a short-run marginal cost basis. This means that it is based on the costs that Network Rail incurs as a result of a small change in traffic levels, assuming network capacity remains fixed. As Table 3 shows, in CP6, the vast majority of costs recovered through the VUC were track maintenance and renewal costs.

Table 3: CP6 VUC cost split.

CP6 VUC Cost Category	CP6 proportion of the VUC
Track	84 %
Civils	13 %
Signalling	3 %

- 3.10 Several changes were made to the VUC methodology at PR18 following its consultation. These are summarised in Appendix 4.

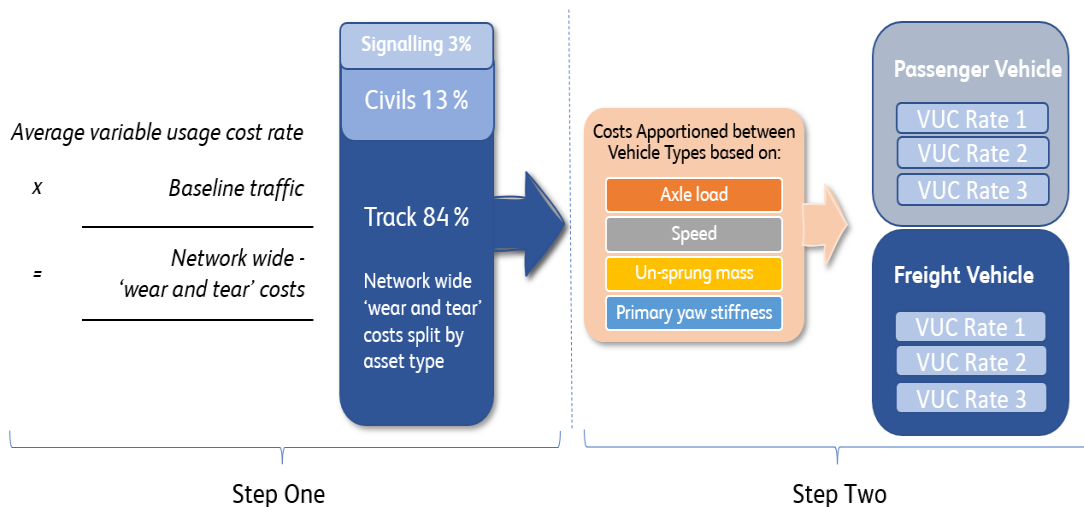
The Variable Usage Charge (VUC) recalibration process

- 3.11 The model used for recalibrating VUC remains largely unchanged methodologically, in line with ORR's conclusions, with only very minor changes relating to recalibration and explained in more detail later in this section.
- 3.12 As noted above, in response to operators' concerns about transparency of the model, Network Rail will publish an in-depth guidance document alongside this consultation. In simplistic terms, the process for recalibrating VUC rates comprises two distinct steps:
- a) **Step one** – Estimating Network Rail's total variable usage costs. These are the proportion of direct maintenance and renewal costs which are incurred as a result of movement of traffic on the network.²⁰ This stage involves estimating a single national average variable usage cost for both passenger and freight traffic, on a £ per 1,000 gross tonne mile basis.
 - b) **Step two** – Adjusting the national average rate to generate rates specific for each vehicle type. This is carried out using formulae designed to estimate the relative 'wear and tear' impact of different types of vehicles based on their individual characteristics (e.g. weight, speed and un-sprung mass).

- 3.13 Figure 3 below illustrates this process.

²⁰ And are permitted to form part of VUC in line with the 2016 Access & Management Regulations and the European Commission Implementing Regulation 2015/909

Figure 3: VUC 2 step process.



ORR's view on the Variable Usage Charge (VUC) at PR23

3.14 In October 2022, ORR made the following conclusions regarding VUC:

- a) ORR concluded that the approach to setting VUCs will be retained for CP7, including the phasing-in of VUC rates for freight, charter and North Yorkshire Moors Railway, to reach full cost reflectivity by the final year of CP7 (consistent with PR18), subject to a review by ORR of the new cost-reflective VUC rates following Network Rail's recalibration for PR23; and
- b) It further concluded that the same cost categories and the underlying track damage formulae used to calculate VUC rates would be retained and that VUC rates could be modified during CP7 to reflect any unexpected changes in heavy axle weight (HAW) network capability instigated by Network Rail.

Proposed approach for CP7

Areas where Network Rail is not making any changes for CP7

3.15 Consistent with ORR's October 2022 charging conclusions, Network Rail will be calculating its total variable usage costs and allocating these costs between railway vehicles, using the same methodology as in PR18 (set out in more detail in Appendix 3 to this consultation). To do this, Network Rail needs up to date vehicle characteristic information.

3.16 As in PR18, Network Rail is consulting on operators' vehicle characteristics and has conducted an initial consultation during September 2022. Of the 41 stakeholders consulted, 23 responded to the initial consultation. Given the importance of setting VUCs accurately, Network Rail is using this consultation to give operators a further opportunity to review the list of vehicle characteristics and advise of any changes.

- 3.17 The list of vehicles and their characteristics are contained in an Excel spreadsheet “PR23 Vehicle Characteristics v1.3 (August 2022)”, consistent with Network Rail’s initial consultation, and published on Network Rail’s website alongside this consultation document. If you have previously responded as part of the **initial consultation** and advised of changes, while these won’t yet be reflected in the Excel spreadsheet, there is no requirement to respond again unless there are further changes to be advised.

Question 2: If you have any further changes to advise in relation to vehicle characteristics in advance of Network Rail’s VUC recalibration, please do so in response to this consultation as there will be no further opportunity to do so.

Freight operators running passenger vehicles

- 3.18 At PR18 Network Rail concluded that if a freight operator is operating a passenger train for testing purposes its VUC rate should be based on the passenger charging methodology, not the freight methodology. Network Rail will then convert this rate from pence per vehicle mile to pounds per 1,000 gross tonne mile to be consistent with the rest of the freight VUC price list.
- 3.19 Initial analysis suggests that this charging policy was overlooked during CP6. Network Rail intends to implement the charging policy as intended for CP7.

Addressing a minor error at PR18

- 3.20 At PR18, Network Rail incorporated the requirements of the recently introduced European Commission Implementing Regulation (EC IR) on the calculation of costs ‘directly incurred’ into its VUC calculations. Network Rail adopted a two-step process to incorporating these requirements;
- a) **Step 1** – calculate the total costs for each asset category and estimate the proportion of the cost of each that is driven by the wear and tear caused by traffic i.e. the proportion that is ‘marginal’, in the language of 2016 Access and Management Regulations (A&MR), and arrive at an estimate of ‘marginal cost’ for each asset; and
 - b) **Step 2** – split the total cost of each asset category into components (e.g. contractor costs; project management costs; etc), to identify any component where, either the component does not vary with the wear and tear caused by traffic (i.e. does not contain marginal costs) or the component contains cost categories that are explicitly prohibited by the EC IR (e.g. ‘network-wide overheads’).
- 3.21 Using this process, Network Rail then reduced its estimates of marginal cost to reflect the proportion of total costs associated with cost components that do not vary with traffic. This implied a 9 % reduction of its VUC cost estimate.

- 3.22 The EC IR remains relevant to the PR23 recalibration, and Network Rail proposes retaining the PR18 identification of cost components, and reduction of marginal cost for the proportion of total costs associated with components containing a cost type explicitly prohibited by the EC IR.
- 3.23 Network Rail has identified an error (the Marginal Cost error) in the way these estimates were reflected in the modelling at Step 2 at PR18. Specifically, where Step 2 seeks to adjust estimates of marginal cost - a measure that by its nature already only includes costs that vary with traffic. Therefore, while it is correct to adjust those estimates for cost categories explicitly prohibited by the EC IR, it is not correct to adjust those estimates for costs that do not vary with traffic, since such costs are already excluded from the marginal cost estimates. Other things being equal, this revised approach to adjusting marginal cost would imply a 5% (as opposed to a 9%) reduction in VUCs. Network Rail will address this recalibration error for PR23 only.
- 3.24 Further details are provided in Appendix 5.
- 3.25 However, in carrying out this review, Network Rail discovered a minor mathematical error in the same part of the VUC model which, for the recalibration of VUCs at CP6, had the effect of all but cancelling out the impact of the error described above. Therefore, Network Rail believe there will be no material impact to VUCs in CP7 as a result of addressing both the Marginal Cost and mathematical error.

Proposal to remove redundant vehicle Variable Usage Charges (VUC)

- 3.26 Network Rail is proposing to remove (most of the²¹) vehicles from the CP7 VUC price list that have not operated on Network Rail's network at any point over the last 6 years.
- 3.27 There are currently over 2,500 individual VUC rates published on Network Rail's price list. Network Rail has undertaken an analysis of the traffic data and has identified 703 vehicles which have not operated on the network at any point over the last 6 years. Network Rail proposes to remove these vehicles from the price list from the start of CP7, unless operators provide specific reasons why any of these vehicles need to remain.
- 3.28 The majority of the 703 vehicles relate to freight wagons and in some circumstances reflect a vehicle type and commodity mix which is inherently unlikely, or a vehicle that no longer exists.
- 3.29 Removing the redundant VUC rates for these vehicles will improve the efficiency of the VUC model and decrease the scope for manifest errors. It will also reduce the number of vehicles on the price list making it more user friendly.
- 3.30 During CP7, should an operator wish to reintroduce one of the vehicles which has been removed as part of this process, that operator could apply to ORR for a new VUC rate, with up-to-date vehicle characteristics, using the same process as for new vehicle rates (or alternatively pay the Default VUC Rate).

²¹ Following responses to Network Rail's initial September consultation on removing redundant vehicles from the price list, it's clear that, so far, some will need to be retained.

- 3.31 Network Rail completed an initial consultation with operators during September 2022 in relation to reviewing existing vehicle characteristics. As part of this consultation Network Rail also requested that operators review the list of vehicles that Network Rail is proposing to remove and advise if any of those vehicles need to be retained, and why. To ensure accuracy and therefore cost reflectivity, Network Rail is giving operators a further opportunity as part of this consultation to review these again.
- 3.32 The list of those vehicles that Network Rail proposes removing from the price list are contained in an Excel spreadsheet “PR23 Vehicle Characteristics v1.3 (August 2022)”, consistent with Network Rail’s initial consultation, and published on Network Rail’s website alongside this consultation document.

Question 3: Where an operator hasn’t already signified otherwise, do you agree with the removal of redundant vehicles from the CP7 price list? Do you have information as to why any of the vehicles which Network Rail propose to remove from the CP7 price list should instead be retained?

Proposal to Recalibrate Default VUC Rates

- 3.33 Network Rail is proposing to recalibrate Default VUC Rates.
- 3.34 The passenger Default VUC Rate for CP7 will be set at the highest equivalent vehicle rate on the CP7 price list, following recalibration, for the vehicle classifications shown in Table 4. For context, if we were to use the highest equivalent vehicle rate on the existing CP6 price list, including supplements, for illustrative purposes, the rates would be as shown in Table 4.

Table 4: illustrative CP7 passenger operator Default VUC Rate

Vehicle Classification	pence per vehicle mile (2017/18 prices)	Equivalent Vehicle Name
Locomotive	96.09	98/8
Multiple unit (motor)	43.36	373/M
Multiple unit (trailer)	20.23	373/T
Coach	17.66	W

- 3.35 Similarly, the Default VUC Rate for freight vehicles will be set at the highest equivalent vehicle rate in the 5th year of the CP7 price list, following recalibration, for locomotives and wagons (Laden and Tare). For context, if we were to use the highest equivalent vehicle rate on the existing CP6 price list, including supplements, for illustrative purposes, the rates would be as shown in Table 5.

Table 5: illustrative CP7 freight operator Default VUC Rates

Vehicle Classification	£/kgm (2017/18 prices)	Equivalent Vehicle Name
Locomotive	8.4818	69/0
Wagon (laden)	5.4881	HRAI (L)
Wagon (tare)	2.6883	ZWAB (T)

- 3.36 Network Rail will continue to keep both the proposed passenger and freight Default VUC Rates under review until they are published to ensure that the highest equivalent rate is reflected.

Proposal to limit refund following use of Default VUC Rates

- 3.37 Network Rail is proposing to limit the recovery of any overcharge for new or modified vehicles²² on Default VUC Rates or a higher un-modified VUC, to the financial year²³ in which the new or modified vehicle VUC rate is agreed²⁴.
- 3.38 The Default VUC Rates for both freight and passenger operators were introduced to serve as an incentive to encourage the operator to apply for a new VUC rate for new vehicles in a timely manner.
- 3.39 During CP6, where an operator introduces a new vehicle onto the network, be it passenger or freight, and where a new VUC has yet to be consented to or determined by the ORR, the Default VUC Rate automatically applies to the new vehicles. Similarly, following the introduction of a modified vehicle where its new VUC has yet to be consented to or determined by ORR, the un-modified VUC automatically applies.
- 3.40 In these circumstances, once a new VUC is agreed, the operator can recover any overcharge to the later of either the introduction date of each individual new / modified vehicle or the start of the control period.
- 3.41 There have been instances during CP6 where operators have run new or modified vehicles for a number of years prior to applying for a new VUC, with the refund also spanning a number of years. As the vehicle characteristics of a new or modified vehicle will be known to the operator in advance of the vehicle entering service, it is unclear why such delays occur.
- 3.42 This policy means that there is limited incentive for an operator to seek a new VUC rate if they have, in some circumstances²⁵, a window of nearly 5 years in which to recover any overcharge. In addition, this policy introduces financial uncertainty for Network Rail who may be unaware of large rebates due to operators, spanning multiple years, or, even if Network Rail are aware, remain unable to transfer budget from year to year due to tighter

²² For modified vehicles, the corresponding un-modified VUC applies until the new VUC is consented to by ORR.

²³ At Network Rail's discretion, should a delay occur with the VUC application out with the control of the operator, then the refund will be limited to a maximum of 12 months from the date on which the new vehicle VUC rate is agreed.

²⁴ 'agreed' meaning consented to or determined by ORR.

²⁵ If an operator introduces the new or modified vehicle towards the start of the Control Period but does not get the associated VUC rate agreed by ORR until near the end of the same Control Period.

fiscal controls as mandated by HM Treasury. Understanding the correct vehicle characteristics, and charges, will help in Network Rail's business planning.

- 3.43 Network Rail proposes that the recovery of any overcharge, following the introduction of a new or modified vehicle during CP7, is limited to the start of the financial year in which the new VUC rate is agreed. This would be consistent with the application of any recharging applied in relation to EC4T where Default Consumption Rates have been applied prior to on-train metering commencing or modelled rates being agreed.

Question 4: Do you agree with Network Rail's proposal to limit refunds back to the start of the financial year in which a new or modified VUC rate is agreed? Please provide justification for your answer.

Indexation

- 3.44 VUCs and bespoke charter operator charges would be subject to indexation by CPI annually, consistent with the approach taken in CP6 and consistent with ORR's conclusions.

Proposed areas for review in advance of the next review of charges

Operator speeds

- 3.45 In response to ORR's 'Initial Proposals' consultation in July 2021, several stakeholders proposed looking at incorporating more granular speed data at a geographical route level into the VUC model, with one operator acknowledging that the benefit may be outweighed by the additional administrative costs and complexity it could add to the VUC model.
- 3.46 The current VUC model does not lend itself to including varying speeds by geography on any given route, and at this stage of the PR23 process, there is no time to contemplate the impact or viability of this proposal.
- 3.47 However, in CP6 Network Rail introduced the ability for operators to apply for route-based maximum speeds²⁶ for new vehicles, which will be retained for CP7.
- 3.48 Vehicle speeds are a key component of the vehicle characteristics which influence the VUC rate. At PR13, Network Rail and Serco undertook a review of how operating speeds are calculated for both passenger and freight vehicles for the purposes of the VUC. Consistent with ORR's October 2022 conclusions, Network Rail will continue to use the methodology and assumptions concluded at PR13 in relation to operating speeds. However, Network Rail is considering the possibility of a potential review of operating speeds early in CP7 to inform the PR28 process.

²⁶ As defined in Network Rail's "[Control Period 6 \(CP6\) Variable Usage Charge \(VUC\) guidance document – the calculation and approval of new rates](#)"

Freight commodities remapping

3.49 During CP7, Network Rail is minded to conduct a review of how freight commodities are currently mapped. Remapping these commodities will help with industry analysis and Network Rail reporting. For example, currently intermodal trains are categorised as ‘Domestic Intermodal’ and it may be helpful to split the category into ‘Maritime’ and pure ‘Domestic’. Additionally, the commodity ‘Other’ contains a mixture of traffic including nuclear, MOD and trains of passenger stock. Any review would need to assess what impact making these changes would have on operators’ VUCs.

Track damage formula

3.50 ORR concluded in its October 2022 conclusions document that there would be no change to the underlying track damage formula used to calculate VUCs for PR23. ORR further concluded that while Serco, on behalf of RSSB, have been conducting a review of some aspects of the Vehicle Track Interaction Strategic model (VTISM), due to the timing of this work it was not feasible to incorporate any proposed changes to the model for PR23. As VTISM is a core component of Network Rail’s VUC model, Network Rail will continue to engage with ORR, RSSB and other industry stakeholders in advance of the next review of charges, as Serco’s work in this area continues.

Question 5: Do you support Network Rail’s proposed areas for review in advance of the next review of charges?

Charter Operators and North Yorkshire Moors Railway (NYMR)

Proposal to retain the current methodology for setting VUCs for charter operators and NYMR

- 3.51 The purpose of this section is to set out Network Rail’s methodology for setting VUC rates for charter operators and North Yorkshire Moors Railway (NYMR) in CP7.
- 3.52 For the avoidance of doubt, where a charter operator or NYMR operates a vehicle which is not included in the relevant section of the published price lists, the equivalent VUC rate on the passenger price list will apply, which is not subject to capping or the ORR’s phasing-in policy.

Charter operator VUC rates

3.53 Consistent with ORR’s October conclusions, Network Rail proposes using the same approach to setting charter VUCs in CP7 as was used in CP6. Unlike other passenger operators, charter operators’ VUC rates are levied on a ‘per train’ basis rather than ‘per vehicle’. The primary reasons for this are to simplify the process for the charter sector given that, comparatively with freight and passenger operators, they run infrequently and with legacy rolling stock, where vehicle characteristic information may not be readily available. This makes calculating new charter VUC rates for rolling stock difficult. Network Rail proposes continuing to assume that a typical charter train is comprised as follows:

- a) One locomotive plus eleven Mark 1 coaches;

- b) The steam locomotive rate should reflect a weighted average of the published rates for a Class 98/5 and Class 98/8 steam locomotive, with a 2:1 weighting in favour of the Class 98/8 based on frequency of use; and
- c) The non-steam locomotive rate should reflect a weighted average of the published rates for a Class 47 and Class 67 locomotive rates, with a 2:1 weighting in favour of the Class 67 based on frequency of use.

3.54 Consistent with ORR's PR18 Final Determination and its October 2022 conclusions, the VUC for charter operators²⁷ will continue to be capped / phased-in during CP7, reaching full cost reflectivity in the final year of CP7.

North Yorkshire Moors Railway (NYMR) VUC Rates

3.55 NYMR is classified as an Open Access Operator. In CP5, NYMR was charged consistently with other passenger operators and paid the VUC rates as set out in the passenger VUC price list. In addition, at PR13, NYMR had two bespoke rates calculated in relation to the use of steam and diesel locomotives to reflect the fact that they are more likely than other open access operators to use locomotives which are not on the published price list and where vehicle characteristic information is not readily available.

3.56 These two bespoke rates reflect the following assumptions:

- a) For steam locomotives, the average of the rates on the published price list for Class 98/4 and Class 98/5 vehicle types; and
- b) For diesel locomotives (not otherwise on the price list) based on the rate for a Class 37/4 vehicle type.

3.57 Consistent with ORR's October conclusions, Network Rail proposes retaining these bespoke VUC rates and calculating them using the same methodology as was used to recalibrate them at PR18.

3.58 Consistent with PR18 ORR's Final Determination and its October 2022 conclusions, the VUC for NYMR will continue to be capped / phased-in during CP7, reaching full cost reflectivity in the final year of CP7.

Question 6: Do you agree with Network Rail's proposal to continue to base charter and North Yorkshire Moors Railway (NYMR) VUCs in CP7 on the same typical train formations as were assumed for CP6? If not, please provide any evidence that you have of a more appropriate assumption.

²⁷ Including the Jacobite operated by West Coast Railways

Charter slot and cancellation charges

3.59 In addition to VUCs, charter operators also pay slot and cancellation charges:

- a) **Slot charges** aim to recover the cost of activities which Network Rail specifically undertake for charter services and are not otherwise funded for. These costs include gauging activities and operational costs (e.g. paying staff to operate ground frames for charter trains to access branch lines).
- b) **Cancellation charges** aim to recover the proportion of the slot charge that has already been incurred, such as the gauging activity, before the decision has been taken to cancel the train. At present, the cancellation charge is calculated as a proportion of the slot charge and varies in accordance with the timing of the cancellation (the later the cancellation the higher the charge).

3.60 Network Rail proposes retaining the same methodology for the application of cancellation charges in CP7, adjusted annually for changes in inflation based on CPI.

Proposal to simplify steam slot charges

3.61 Network Rail proposes to simplify the approach to slot charging for steam driven equipment by introducing a single steam slot charge, rather than the two that currently exist for journeys over and under 250 miles.

3.62 Unlike diesel or electric hauled charter services, steam hauled charter services attract a different slot charge dependent on whether they are defined as ‘over’ or ‘under’ 250 miles. These charges are illustrated in the Table 6.

Table 6: Existing slot charges

Description of Service	Total journey length including ECS mileage not exceeding 250 miles (£, 2017/18 prices)	Total journey length including ECS mileage exceeding 250 miles (£, 2017/18 prices)
Train hauled by Diesel or Electric Equipment or consisting of EMU or DMU	343.2427	343.2427
Train hauled throughout or in part by Steam Driven Equipment	613.1715	858.6621

3.63 The reason for the differential between the steam slot charges and the diesel slot charge, is due to the additional costs which Network Rail only incurs as a result of facilitating the operation of steam locos on the network, for example, bespoke gauging activities, which form the majority of these additional costs. Most steam locos are unique in their attributes making it more labour intensive when assessing a steam bid against the capability of the route being bid for.

3.64 However, in responding to customer demand, Network Rail no longer undertakes gauging activities on a journey-by-journey basis but subcontracts gauging work externally for a year in advance, for all steam locos. This gives steam operators certainty with regards to route compatibility and allows them to plan with greater efficiency and certainty. It is therefore no longer the case that there is a higher workload associated with longer steam-hauled journeys compared to shorter journeys.

Proposed changes to the steam slot charge

- 3.65 Charging for charter trains has remained largely free from reform since its conception. Unlike for passenger operators, the majority of the billing process for charter operators requires manual interventions. The current steam slot charges²⁸ require the Track Access Billing System (TABS) team to manually review each individual bid, calculate journey lengths and then apply the correct charge. As well as being time consuming, any manual process of this nature is more susceptible to errors.
- 3.66 As Network Rail continues to modernise its activities and respond to customer demand more effectively, it follows that this should be reflected, where possible, in its charging regime. Given that the primary purpose of the differential in the steam slot charge was to reflect the costs and time involved in gauge clearance activities for ‘short’ and ‘long’ journeys, and that these activities are now undertaken externally at the start of each year, there is no longer a need to reflect two different slot charges associated with journey length.
- 3.67 Network Rail therefore proposes a single steam slot charge for ‘Trains hauled throughout or in part by Steam Driven Equipment’. This would be recalibrated by determining a charge on a sliding scale between the two existing charges in proportion with the number of steam journeys which are classified as ‘under 250 miles’ compared to those which are classified as ‘over 250 miles’.
- 3.68 Network Rail understands that those charter operators who operate steam locomotives are supportive of a single steam slot charge as it would help to simplify the convoluted billing file produced each period by Network Rail’s TABS team which is, in part, caused by the two steam slot charges. The proposed methodology for calculating the single charge would have minimal net impact on the charges levied by Network Rail.

Methodology for calculating a single steam slot charge

3.69 Three methods for recalibrating a single steam slot charge for CP7 were explored. Appendix 6 contains the full report with detailed analysis and results. In summary, the methods assessed for suitability were as follows:

- a) Method 1 - assign the midpoint of the two existing charges as the new slot charge for steam hauled services;

²⁸ Slot charges are applied to each individual bid which can contain a number of individual train journeys taking place over a number of days. If the cumulative mileage of a bid exceeds 250 miles, then the bid attracts the higher slot charge.

- b) Method 2 - assign a single steam slot charge on a sliding scale between the two existing charges in line with the proportion of steam journeys which are classified as 'over 250 miles' and attract the higher charge compared to those which are classified as 'under 250 miles' and attract the lower charge, based on journey count in each category; and
- c) Method 3 – similar to Method 2, but the proportionality is based on the cumulative mileage assigned to each category rather than journey count.

Impact to Operators and Network Rail

- 3.70 When assessed against the other methods (details contained in Appendix 6), Method 2 was deemed to be to most appropriate as it has the least impact on both Network Rail and operators when compared with the existing charging structure. The impact of using the single steam slot charge calculated using Method 2, over the period of time analysed²⁹, would have been a **2% reduction in income to Network Rail**. Three out of the 4 operators would pay between 2 – 5 % less, with only 1 operator paying slightly more (6.7 %). However, in real terms, the increase for the operator in question is likely to be less than £2.5k per annum (2017/18 prices).
- 3.71 Analysis of the data shows that for Method 2, 87.42 % of all journeys are classified as 'Over 250 Miles'. This percentage was then used to assign a single slot charge between the existing two slot charges which equates to £827.78 in 2017/18 prices.

Question 7: Do you agree with Network Rail's proposal to simplify the steam slot charge by introducing a single steam slot charge? Do you agree that a single steam slot charge should be calculated based on the proportion of journeys classified as 'steam under 250 miles' and 'steam over 250 miles'?

²⁹ The details of the time period analysed are contained in Appendix 6.

4 Electricity Current for Traction (EC4T)

Purpose and structure of the chapter

- 4.1 The purpose of this chapter is to set out Network Rail's proposed approach to the Electric Current for Traction (EC4T) charge in CP7 and seek stakeholders' views on its proposals. The remainder of this chapter is structured as follows:
- a) Summary of Network Rail's proposals;
 - b) Key changes to the EC4T charges at PR18;
 - c) Background;
 - d) Proposed approach for CP7; and
 - e) Charter Operators.

Summary of Network Rail's proposals

- 4.2 Network Rail agrees with ORR that operators of electric traction should continue to be appropriately incentivised to increase the uptake of on-train metering. With the continuing rise of energy prices, this is more important than ever. Using on-train meters to capture actual energy used rather than using Generic, Modelled or Default Consumption Rates, can have the following positive effects:
- a) Coupled with GPS data, actual energy consumption data from on-train meters allows operators to understand the energy consumption of their electric vehicles, on any given journey, in real time. This information can, in turn, facilitate more efficient driving styles, help identify energy wastage, for example from non-journey metered costs from stabling with pantographs still drawing power in depots, and in some circumstances, help identify faults, all of which will help reduce energy consumption;
 - b) Reducing energy usage and therefore costs, will encourage greater use of electric traction and the shift away from diesel traction, helping towards the government's decarbonisation goals;
 - c) Operators would receive more accurate billing compared to using Modelled, Generic or Default Consumption Rates; and
 - d) An operator is less susceptible to the volatility of the EC4T wash-up process.
- 4.3 As determined by ORR in its October 2022 conclusions document, the reforms outlined in this section are aimed at encouraging increased usage of on-train metering and removing aspects of the charge which are not used or are no longer considered to be fit for purpose. The reforms include:
- a) Removing Modelled Consumption Rates³⁰ for New Train Services;

³⁰ ORR refers to these as 'bespoke modelled rates' in its October 2022 Conclusions document.

- b) Removal of Partial Fleet Metering (PFM); and
 - c) Removal of the Loss Incentive Mechanism.
- 4.4 The reforms detailed at 4.3 a) and 4.3 b) are still subject to a further review by ORR during the remainder of PR23.
- 4.5 Additionally, Network Rail is proposing;
- a) New Default Consumption Rates for passenger operators;
 - b) The removal of Generic Consumption Rates for passenger operators;
 - c) The introduction of Default Consumption Rates for freight operators in place of the Generic Consumption Rates; and
 - d) The recalibration of the Distribution System Loss Factors.
- 4.6 Network Rail has reviewed stakeholder's responses to both [ORR's July 2021 and April 2022](#) consultations on Network Rail's access charges. The majority of operators were supportive of removing Modelled Consumption Rates for new rolling stock.
- 4.7 However, a number of operators felt that removing Modelled Consumption Rates for new services, leaving them with the choice of either fitting on-train meters to old rolling stock or using the Default Consumption Rate, could create an unnecessary barrier to convert business to rail. Freight operators particularly addressed the fact that they often need to respond to changes in customer demand at short notice and the Default Consumption Rate for non-metered traction could incentivise the operator, if they have the option, to use diesel traction instead.
- 4.8 There was overwhelming support for the removal of Partial Fleet Metering.
- 4.9 Of those that expressed a view, the majority of operators also supported the removal of the Loss Incentive Mechanism. Only two operators were not supportive with one suggesting it should be altered but not removed.

Background

Purpose of the Electric Current for Traction (EC4T) charge

- 4.10 The purpose of the EC4T charge is to recover the costs of traction electricity supplied by Network Rail to train operators to power electrified services.
- 4.11 EC4T is paid by all operators which run electrified train services. In 2021/22 Network Rail received £482m in EC4T income from train operators. As described in more detail in an operator's Track Access Contract, electrified services are charged on the basis of their energy consumption, measured in kWh (kilowatt-hours), multiplied by the relevant pence per kWh tariff in order to produce their invoice.
- 4.12 For operators using on-train meters, energy consumption is determined by using one of the following methods:

- a) Taking a kWh reading directly from the on-train meters; or
 - b) Where a reading from the on-train meter has not been received by Network Rail, using an infill charge which is based on previously received readings from the on-train meters for that operator's vehicle and for a specific route section.
- 4.13 For operators without on-train meters, energy consumption is determined by using one of the following methods:
- a) applying a Modelled Consumption Rate;
 - b) applying a Generic Consumption Rate; or
 - c) applying a Default Consumption Rate.
- 4.14 At the end of each financial year, electrified services billed on the basis of Modelled Consumption Rates participate in the volume reconciliation (often referred to as the volume 'washup'), which reconciles modelled kWh consumption and actual consumption in each Electricity Supply Tariff Area (ESTA). This results in an increase or decrease in the allocation of the kWh consumption to operators.
- 4.15 Similarly, at the end of each financial year, all electrified services participate in the cost reconciliation (often referred to as the cost 'washup') which reconciles the pence per kWh tariffs charged in each period with the actual pence per kWh tariffs that Network Rail paid for that electricity on behalf of train operators. These differ because many government instigated levies to support renewable generation are not known until the financial year has ended and also some delivery charges are fixed costs for Network Rail so the out-turn rate depends on the out-turn consumption.
- 4.16 The net effect of the volume washup and the cost washup are presented and invoiced together.

ORR's view on the Electric Current for Traction (EC4T) charges in PR23

- 4.17 In [July 2021 and April 2022](#), ORR consulted on the following reforms to EC4T charges:
- a) Removing Modelled Consumption Rates for New Train Services³¹;
 - b) Removal of Partial Fleet Metering (PFM); and
 - c) Removal of the Loss Incentive Mechanism.
- 4.18 In October 2022, ORR concluded that the ability to apply for Modelled Consumption Rates for New Train Services, Partial Fleet Metering and the Loss Incentive Mechanism should all be removed.

³¹ "New Train Services" means any service that uses vehicles that are brand new to the industry, or existing vehicles that require a new modelled consumption rate (for example because their operator moves them to a new service code). As defined by ORR in their April 2022 Further Proposals consultation document.

Proposed change for CP7

ORR's Conclusions

Removal of the Modelled Consumption Rate for New Train Services

- 4.19 As directed in ORR's October 2022 conclusions, to incentivise the uptake in on-train metering, train operators will no longer be able to apply for Modelled Consumption Rates for New Train Services in CP7. Operators of electric traction on New Train Services will either need to be fitted with compliant on-train meters, with operators supplementing their Track Access Contracts accordingly, or be charged the Default Consumption Rate calculated for CP7.
- 4.20 For the avoidance of doubt, during CP7, should any new electric rolling stock enter service prior to consent being granted by ORR to supplement the operator's 'Metered Trains' table in Appendix 7D of Schedule 7, then the Default Consumption Rate will apply until such time as the ORR publishes its consent notice.

Removal of the Loss Incentive Mechanism

- 4.21 As directed in ORR's October 2022 conclusions, in CP7, Network Rail will cease to calculate the Loss Incentive Mechanism, which gives Network Rail a share of the traction electricity wash-up, as it no longer acts as an effective incentive to reduce transmission losses.

Removal of Partial Fleet Metering

- 4.22 Partial Fleet Metering allows operators to extrapolate energy consumption from data taken from metered trains to estimate consumption on similar un-metered trains. Since its introduction at CP5, Network Rail notes that no train operator has taken up this option. In October 2022, ORR concluded that the Partial Fleet Metering option should be removed.

Network Rail's proposed approach

Proposal to recalibrate passenger Default Consumption Rates

- 4.23 In CP6, Network Rail introduced a Default Consumption Rate for passenger services operating electric traction³² to incentivise operators to apply for a Modelled Consumption Rate or complete contractual changes relating to on-train metering in a timely manner.
- 4.24 It was determined that the Default Consumption Rate would need to be reasonably high to appropriately incentivise operators. It was concluded that it should be set equal to the highest rate for electric multiple units published on the Modelled Consumption Rates List (including supplements) prior to the start of the control period. Similarly, it was concluded that the Default Consumption Rate for electrified locomotive-hauled passenger services should be equal to the highest rate for electrified locomotive-hauled passenger services on the Modelled Consumption Rates List (including supplements) prior to the start of the control period.

³² [Network Rail's consultation on variable charges and station charges in Control Period 6 CP6 \(July 2017\)](#)

- 4.25 For CP7, it remains important that the Default Consumption Rate is still set at an adequately high level to continue to have the desired incentive. Using the same methodology for CP7 as used at CP6 would achieve this and it is therefore appropriate to continue to determine Default Consumption Rates in this way. For CP7, based on the current traction electricity Modelled Consumption Rates List, the rates would be as follows:

Table 7: Proposed CP7 passenger Default Consumption Rates.

Loco* / MU**	1 x Unit	2 x Unit	3 x Unit	Equivalent Vehicle Name	Vehicles / Cars per unit
Loco	64.112	n/a	n/a	92/0	N/A
MU	58.64	112.589	167.124	345	9

*Loco: kWh per electrified kgm

**MU: kWh per electrified train mile

- 4.26 For a loco-hauled passenger service these continue to equate to a class 92/0 on train service code 23557004. For electric multiple units these now equate to the rate for a class 345 on train service code 21384001. Network Rail will continue to keep these rates under review until they are published to ensure that if a higher Modelled Consumption Rate is subsequently published on the Modelled Consumption Rates List, then it becomes the basis for the Default Consumption Rate.

Question 8: Do you agree with Network Rail's continued approach for setting passenger Default Consumption Rates? If not, please provide a justification for your response.

Proposal to remove passenger Generic Consumption Rates

- 4.27 Network Rail is proposing the removal of Generic Consumption Rates for passenger operators.
- 4.28 Network Rail and ORR are generally limited in their capacity to incentivise the use of more environmentally friendly operating practices. One measure is to continue to encourage operators' uptake in the use of on-train meters through changes in EC4T charging policy. Network Rail believes that removing Modelled Consumption Rates for New Train Services will help encourage operators to increase their usage of on-train metering, which will contribute to the positive outcomes as detailed in paragraph 4.2.
- 4.29 As part of Network Rail's response to ORR's April 2022 consultation, it sought to clarify if the intention of the proposal, as Network Rail believed, was to encompass the use and therefore the removal, of Generic Consumption Rates on New Train Services also. ORR acknowledged in its October 2022 conclusions that the effectiveness of its Modelled Consumption Rate policy may be affected by the treatment of Generic Consumption Rates, and it committed to further reviewing this prior to its Draft Determination.
- 4.30 Under current arrangements, passenger operators wishing to use existing rolling stock on a new service will typically already have both:

- a) one or more Modelled Consumption Rates for existing services; and
- b) a Generic Consumption Rate for that rolling stock, available for use on any new service operated by that rolling stock, instead of, or pending approval of a new Modelled Consumption Rate.

- 4.31 Generic Consumption Rates have been used widely during CP6 on over 330 individual Train Service Codes and on over 220 since April 2022.
- 4.32 Generic Consumption Rates are less accurate at determining energy consumption used. For example, if you were to substitute the Modelled Consumption Rate with the equivalent Generic Consumption Rate for that vehicle³³, it could differ by as much as 58%. While this is a worst-case scenario, comparing more than 300 Modelled Consumption Rates against the equivalent Generic Consumption Rates for that vehicle class, more than half have a difference of greater than + or - 10%. Using Generic Consumption Rates is therefore less accurate than using Modelled Consumption Rates or on-train meters. The continued use of Generic Consumption Rates is likely to mean that the EC4T volume 'washup' will be more volatile than if Modelled Consumption Rates alone were in use, affecting all operators within that ESTA.
- 4.33 To compliment ORR's decision to incentivise the uptake in on-train metering by removing an operator's ability to apply for new Modelled Consumption Rates on New Train Services, and to avoid a scenario where an operator can use the potentially less reflective Generic Consumption Rate instead of getting a new Modelled Consumption Rate calculated in advance of CP7 or commissioning on-train meters, **Network Rail is proposing the removal of all passenger Generic Consumption Rates from the start of CP7.**
- 4.34 In addition, by removing Generic Consumption Rates from the Track Access Billing System (TABS), it will serve to further simplify the charging for EC4T.

Impact on passenger operators

- 4.35 Where passenger operators are currently using the Generic Consumption Rate as opposed to getting a Modelled Consumption Rate calculated or commissioning new or existing on-train meters, from the start of CP7, the Default Consumption Rate will apply in these circumstances. Early indicative analysis suggests that the majority of operators' vehicles being charged using the Generic Consumption Rate have on-train meters fitted and to avoid being charged the Default Consumption Rate, operators can commission their on-train meters and have them added to their contracts accordingly. Alternatively, if operators choose not to install or commission existing on-train meters, then they will have until the end of CP6 to apply for any new Modelled Consumption Rates.

³³ Generic Consumption Rates apply to a vehicle class only and are not specific to a Train Service Code or operator.

- 4.36 If an application for a new Modelled Consumption Rate is in progress³⁴ before the end of CP6, then the operator will be allowed to complete the application during the first year of CP7. The Default Consumption Rate will apply from the start of CP7 regardless, but once the application has been consented to by ORR, any over or under charge incurred during year 1 of CP7 will be refunded³⁵ or made payable.
- 4.37 Atkins, which undertake Modelled Consumption Rate calculations on its behalf, have advised that with the provision of accurate and timely information from operators, they should be able to cope with an uplift in applications in advance of CP7.
- 4.38 While this consultation is out for deliberation, Network Rail will continue to refine its understanding of how this proposal will translate in terms of the scope of impact on stakeholders.

Question 9: Please provide evidence and justification for Network Rail's consideration if you do not agree with Network Rail's proposal to remove Generic Consumption Rates for passenger operators in CP7.

Proposal to remove freight Generic Consumption Rates and introduce Default Consumption Rates

- 4.39 Currently, freight operators only have Generic Consumption Rates and Modelled Consumption Rates published on the Modelled Consumption Rates List. Network Rail proposes the removal of freight Generic Consumption Rates and replacing these with freight Default Consumption Rates.
- 4.40 This will align the consumption rates for freight operators with Network Rail's proposed approach for passenger operators in CP7, bringing consistency to terminology and enabling the removal of Generic Consumption Rates for both passenger and freight operators.
- 4.41 Table 8 compares the ranges of existing freight Modelled Consumption Rates with their corresponding Generic Consumption Rates, published on the Modelled Consumption Rates List.

³⁴ At Network Rail's discretion, "in progress" is broadly defined as external consultants being actively engaged in the calculation of the new Modelled Consumption Rate.

³⁵ Assuming the Modelled Consumption Rate is agreed with sufficient time to allow the TABS team to process the changes in advance of the EC4T wash-up at the end of year of CP7.

Table 8: freight Modelled, Generic and proposed Default Consumption Rates

Modelled Consumption Rate Range*		Generic Consumption Rate*	Generic Consumption Rate Name	Proposed Default Consumption Rate* for CP7
Min	Max			
24.92	25.54	25.27	Generic: heavy haul	25.54
36.24	38.82	38.00	Generic: inter-modal	38.82
46.38	46.38	46.38	Generic (Multiple Units): parcels/mail	46.38
53.61	53.61	53.61	Generic (Locomotive & coaches): parcels/mail	53.61

*kWh per electrified kgkm

- 4.42 Table 8 shows that the Generic Consumption Rates for freight are either equal, or set similar to, the range of corresponding Modelled Consumption Rates. Network Rail is proposing to adopt a similar approach to setting freight Default Consumption Rates as it does for passenger operators (described in detail at paragraph 4.24).
- 4.43 Under this approach, the freight Default Consumption Rate would be set equal to the highest corresponding freight Modelled Consumption Rate for its traffic type. This impact would be small and only affect heavy haul and inter-modal rates with increases of 0.27 and 0.82 kWh per kgkm respectively.

Question 10: Do you agree with Network Rail's proposal to remove freight Generic Consumption Rates and replace them with freight Default Consumption Rates, aligning nomenclature and methodology with passenger operator consumption rates? If not, please provide a justification for your response.

Recalibration of Distribution System Loss Factors (DSLFs) and new ESTAs

- 4.44 Train operators opting-in to the on-train metering billing system on the Network Rail 25 kV AC and 750 V DC traction networks are charged on the basis of their metered energy consumption plus a percentage uplift to account for electrical losses in the network. These uplifts are the Distribution System Loss Factors (DSLFs). Electrical losses consist of a combination of fixed and variable losses. The fixed losses occur all the time the network is energised. The variable losses occur when current is flowing through system components, predominantly as a result of trains drawing traction energy.
- 4.45 At PR18, as required by ORR, Network Rail calculated revised estimates of the DSLFs using an updated methodology. In Network Rail's conclusions in May 2018, it committed to recalibrating the DSLFs again for CP7. The recalibration for CP7 has now been undertaken and followed the same methodology³⁶ and approach used to recalibrate DSLFs at CP6.
- 4.46 While the methodology followed to calculate the DSLFs has not changed from CP6 to CP7, the assumptions have been updated. The updated assumptions are contained in Appendix 7 along with a table of the newly calculated DSLFs Network Rail is proposing for CP7. These have been provided to ORR who will ultimately determine the DSLFs to be applied in CP7.

³⁶ The methodology, "[Estimation Methodology and Assumptions for the CP6 Distribution System Loss Factors](#)" can be found in the annexes to Network Rail's PR18 consultation.

- 4.47 In summary, the DSLFs have changed marginally, with -1.91 % being the biggest reduction, 5.19 % down to 3.28 % in ESTA B on the East Coast. The biggest increase of only 1.67 % is seen in ESTA V on Wales and Western, moving from 1.18 % to 2.85 %.
- 4.48 Further electrification of the network is an integral part of the government's decarbonisation strategy and as such it is possible that the industry may see new ESTAs created during CP7. If a new ESTA were to be established mid-control period, Network Rail would need to calculate DSLFs so that it could charge any metered operators, who ran trains in that ESTA, for their total energy consumption.
- 4.49 During CP7 the DSLFs for a new ESTA will be calculated using the same methodology as Network Rail has used to recalibrate DSLFs of existing ESTAs for CP7.

Question 11: Do you agree with Network Rail's proposal to recalibrate DLSFs using the same methodology used at CP6? If not, please provide justification to support your position.

Regenerative Braking Discounts

- 4.50 Operators of non-metered electric services which operate a regenerative braking system can apply to receive a fixed percentage discount to their Modelled Consumption Rates to reflect the fact that, under braking, useable energy is returned to Network Rail's distribution system.
- 4.51 Prior to CP6, these discounts were set on the basis of estimates informed by expert engineering judgement. At CP6 Network Rail recalibrated these discounts using actual data taken from trains capable of regenerative braking with on-train meters.
- 4.52 Network Rail's expert engineers have not seen any evidence to suggest a recalibration of these discounts is necessary for CP7. Network Rail is therefore proposing that regenerative braking discounts for non-metered trains contained in the Traction Electricity Rules remain unchanged as per Table 9.

Table 9: Regenerative Braking Discounts

Type of infrastructure / service frequency	Discount (%)
AC, Long Distance (more than 10 miles between stations)	16%
AC, Suburban (less than or equal to 10 miles between stations)	22%
DC	15%

Question 12: Do you agree with Network Rail's proposal to retain the existing CP6 Regenerative Braking Discounts for CP7?

Charter Operators

- 4.53 In CP6, electric charter services have been charged for their electricity usage on the basis of a single modelled consumption rate, levied on a kWh per electrified train mile basis. Recognising the low materiality of charter EC4T charges, charter operators have been excluded from both the volume and cost reconciliations. In each year of CP6, charter services' consumption has been charged a pence per kWh tariff that is calculated by summing the energy tariff that Network Rail secures for operators with low electricity consumption, and an average national delivery tariff.
- 4.54 Network Rail will retain the current charging framework for electrified chartered services for CP7.

5 Electric Asset Usage Charge (EAUC)

- 5.1 The purpose of this chapter is to set out Network Rail's proposed approach to re-calibrating the Electrification Asset Usage Charge (EAUC) for CP7, and to seek stakeholders' views on this approach. This chapter focuses on the methodology for calculating EAUC rates for CP7.
- 5.2 The remainder of this chapter is structured as follows:
- a) Summary of Network Rail's proposals;
 - b) Background; and
 - c) Proposed approach for CP7;

Summary of Network Rail's proposals

- 5.3 As determined in ORR's October 2022 conclusions document, the current structure of the EAUC will be retained for CP7. Consistent with this, Network Rail will calculate operators' CP7 EAUC rates using the same methodology as was used to calculate rates in CP6.
- 5.4 This view was supported by the majority of stakeholders who responded to [ORR's July 2021 consultation](#) on Network Rail's access charges.

Background

Purpose of the Electrification Asset Usage Charge (EAUC)

- 5.5 The purpose of the Electrification Asset Usage Charge (EAUC) is to recover the traffic driven variable costs (costs that vary with changes in the level of electrified traffic) of maintaining and renewing electrification assets. The charge is paid by all operators of electrified services. In 2021/22 Network Rail received £20m of income through the charge.
- 5.6 EAUC rates are split into DC and AC and provided for passenger (including Open Access and charter) and freight operators separately.
- 5.7 A detailed explanation of the methodology used to calculate EAUC rates at PR18, and by extension PR23, was published in Appendix 3 to "[Annex to Network Rail's consultation on variable charges and station charges in Control Period 6 \(July 2017\)](#)". In summary, EAUC rates were calculated for CP6 by:
- a) Forecasting the long-run maintenance and renewal costs of electrification assets using the latest 35-year³⁷ forecasts;
 - b) Using engineering judgement to quantify the proportion of maintenance and renewal costs that vary with changes in electrified traffic levels (the 'cost variability assumptions'); and

³⁷ Network Rail concluded at CP6 that the approach in CP5 (of using a single year's volumes) would have led to an EAUC that could not be justified on cost reflectivity grounds. This change was supported by operators.

- c) Dividing the forecast variable costs by forecast electrified traffic levels to calculate EAUC rates.

ORR's view on the Electrification Asset Usage Charge (EAUC)

- 5.8 In October 2022, ORR concluded that the EAUC should not be altered, beyond recalibration, in PR23.

Proposed approach for CP7

- 5.9 Consistent with ORR's conclusions, for passenger (including open access and charter) and freight operators, Network Rail does not propose altering the EAUC beyond recalibration in PR23.
- 5.10 For CP5 and CP6, Network Rail concluded that EAUC rates for charter services³⁸ should be set at the same level as EAUC rates for passenger services. Network Rail does not propose a change to this approach for CP7.
- 5.11 Recalibration will involve recalculating EAUC rates to reflect Network Rail's latest long-run forecasts of costs and traffic and adjusting these to reflect the cost variability assumptions determined for PR23.

Recalibration

- 5.12 As part of PR23, Network Rail will recalculate the AC and DC EAUC charges using the most recent, 35-year forecasts of long-run renewal and maintenance costs (for electrification assets) and traffic volumes.
- 5.13 In addition, Network Rail has reviewed the cost variability assumptions that were used to calculate EAUC rates at PR18 and has determined that these assumptions remain appropriate to calculate EAUC rates in PR23. Appendix 8 contains the table of the cost variability assumptions to be used in the EAUC model.
- 5.14 A report detailing how these cost variability assumptions were calculated is contained in Appendix 4 to "[Annex to Network Rail's consultation on variable charges and station charges in Control Period 6 \(July 2017\)](#)".

Question 13: Do you agree with Network Rail's decision to adopt the cost variability assumptions previously determined at CP6 to recalibrate the EAUC rates? If not, please provide supporting evidence for any alternative suggestions.

Indexation

- 5.15 The Electrification Asset Usage Charge will be subject to indexation by CPI annually, consistent with the approach taken in CP6 and consistent with ORR's conclusions.

³⁸ Due to the change in indexation approach from CPI to RPI the actual EAUC was slightly different in CP6.

6 Station Long Term Charge (LTC) and Qualifying Expenditure (QX) Management Fee for managed stations

Purpose and structure of the chapter

- 6.1 The purpose of this chapter is to set out, and seek stakeholders' views on, Network Rail's approach to recalibrating the Stations Long Term Charge (LTC) for CP7. It also confirms the approach that will be taken with respect to the Qualifying Expenditure (QX) charge for managed stations at CP7.
- 6.2 This chapter is structured as follows:
- a) Summary of changes;
 - b) Background; and
 - c) Changes for CP7.

Summary of changes

- 6.3 Following industry consultation, ORR confirmed in its October 2022 conclusions document that it will implement two changes to the methodology for setting station LTCs in CP7, as follows:
- a) Station specific LTC calculation for large stations – Network Rail will implement a change in the classification of stations which is used to determine which LTC calculation methodology applies at each station. This doesn't impact on the LTC calculation methodology but will move some stations from one calculation methodology to another based on station size as opposed to managed status.
 - b) Approach to charging new stations – Network Rail will make an adjustment to the current methodology which extends the discount on the operational property element of the LTC at new stations³⁹ to apply for a fixed five-year period. The discount under the current methodology applies from the date on which the station opened until the end of the control period in which the station opened.
- 6.4 In addition, there will be a move from route-based to region-based cost forecasting⁴⁰ of the inputs required for the category average LTC calculation.
- 6.5 The response from the industry to these changes was generally supportive. The responses included some constructive observations which have strengthened Network Rail's awareness of views within the industry with regards to the station LTCs. In particular, and in response to the industry wish for improved transparency and clarity around the station charging methodology, Network Rail will produce a guidance document which provides details on the

³⁹ New stations under a category average calculation only (i.e. not applicable to station specific LTCs).

⁴⁰ This is in line with changes to Network Rail's operating model, following devolution, from eight routes to fourteen routes within five regions, referred to in [Network Rail's response to ORR's April 2022 Further Proposals consultation](#) – available on the [Network Rail PR23 Information for operators site](#).

LTC calculation at PR23. This guidance document will be published on the Network Rail website before the start of CP7.

Background

Purpose of the station Long Term Charge (LTC)

- 6.6 The purpose of the station Long Term Charge (LTC) is to recover Network Rail's maintenance, repair and renewal (MRR) costs for each of the stations which it owns. The charge is levied at both franchised and managed stations. In 2021/22 Network Rail received £251m of income through the charge.
- 6.7 At franchised stations, the LTC is payable to Network Rail by the Station Facility Owner (SFO). Where other operators call at the station, the SFO will recover a proportion of the total LTC for that station from those operators in proportion to their share of the number of vehicle departures.
- 6.8 At managed stations, Network Rail recovers the MRR costs for that station directly from the operators who call at the station, in proportion to their share of the number of vehicle departures.
- 6.9 The LTC recovers MRR costs of both operational property and station information and security system (SISS) assets. Operational property assets include structural elements of the station such as platforms and canopies. SISS assets include items such as customer information systems, closed-circuit television, and public address systems.

Changes for CP7

- 6.10 At PR18, a station specific calculation methodology was applied to Network Rail managed stations and a category average methodology was applied to franchised stations.
- 6.11 ORR has determined that the station specific and category average approaches are still appropriate, given the views from the industry and expected changes under industry reform. As such they will be retained for CP7.
- 6.12 There are three minor changes that will be incorporated into the LTC model at PR23; one which reflects a change in Network Rail's geographic breakdown and two which reflect ORRs October 2022 conclusions. These three changes are outlined in the following sections.

Move from route-based to region-based cost forecasting

- 6.13 As referred to in [Network Rail's response to ORR's April 2022 Further Proposals consultation](#), the category average LTC calculation⁴¹ will be done on a regional basis (as opposed to on a route basis) in PR23; this is in line with devolution and Network Rail's changes to its operating model.

⁴¹ Based on control period total maintenance, repair and renewals forecasts.

- 6.14 This change is due to Network Rail's recent internal restructuring as part of the business's commitment to putting passengers first⁴². In 2019 the business implemented the formation of new routes and regions, moving from eight routes to five regions⁴³ which are split into a total of fourteen new routes. At PR23 the category average station LTCs will be calculated based on these five regions⁴⁴.
- 6.15 With the exception of Scotland, each of the five regions is larger and contains more stations than each of the eight former routes which existed at CP6.
- 6.16 Figure 9 of Appendix 9 shows the breakdown of station categories within the five regions compared to that within the CP6 former routes.

Impact of change

- 6.17 The category average LTCs will be impacted by the move from route-based to region-based cost forecasting, however it is not possible to provide an indication of the scale of any impact at this stage in the periodic process, since the cost forecasts for CP7 are unknown. The draft price list, due to be published in May 2023, will reflect the impact of this methodology change.
- 6.18 However, the overall costs at a regional level will not change; any impact will be distributional in nature since the categories will be split into 5 regions as opposed to the 8 former routes (as in CP6). The number of stations in each region will be greater and the ratio between station categories⁴⁵ within the regions will be different.

Changes to the LTC calculation reflecting ORR conclusions

Summary of ORR conclusions

- 6.19 As part of ORR's July 2021 Initial Proposals and April 2022 Further Proposals consultations, ORR proposed a number of changes to station charging for PR23; two of these changes have been confirmed in ORR's October 2022 conclusions and will therefore be implemented at PR23. These changes are summarised below:
- a) The station LTC for 32 large stations will be calculated using station specific expenditure forecasts in CP7, with the remainder of station LTCs calculated using a category averaged approach.
 - b) The operational property element of LTCs for new stations (under the category averaged calculation) which have either opened during CP6 or will open during CP7, will be set at 10 % of that for equivalent existing stations for a fixed five-year period from the date of opening.

⁴² See [Network Rail's Putting Passengers First web page](#).

⁴³ Eastern, North Western & Central, Scotland, Southern and Wales & Western.

⁴⁴ This is instead of being based on the 8 routes as at PR18.

⁴⁵ For a summary of the station categories, based on passenger usage, see Appendix 10.

Station specific Long Term Charge (LTC) calculation for large stations

Approach for PR23

- 6.20 At PR23, Network Rail will set station specific LTCs for the 32 large⁴⁶ stations (the List) which ORR listed in its PR23 charges conclusions⁴⁷.
- 6.21 All remaining stations will have their LTCs set using the category average calculation.
- 6.22 This change is effectively a change in the decision criteria that determine which stations fall under each of the station specific and category average LTC calculations; the calculation methodologies for each of these will remain unchanged. Instead of a station's managed status dictating how its LTC is calculated, passenger usage at stations will be used as a measure of station size to place a group of the largest stations from each region under the station specific calculation, irrespective of managed status.
- 6.23 This means that where in CP6:
- a) The 20 Network Rail managed stations had station specific LTCs; and
 - b) Franchised stations had category averaged LTCs.
- 6.24 In CP7:
- a) 32 large stations will have station specific LTCs; and
 - b) All remaining stations (not classed as large) will have category averaged LTCs.
- 6.25 For PR23, there will be 32 large stations spread across the five regions. However, Network Rail considers the possibility that since the List of large stations is determined using station passenger usage data, this List may be subject to change. Assuming the LTC charging methodology does not change, the List of large stations should be reviewed as part of any future Periodic Review process.

Impact of change

- 6.26 It is anticipated that this change will improve the cost reflectively and transparency of the LTCs for the largest stations and will reduce the distorting effect of larger stations on LTCs of smaller stations under the category average calculation.
- 6.27 The new approach to determine which stations will have a station specific LTC implies that stations could move from one LTC calculation⁴⁸ to the other between control periods, in

⁴⁶ Where the 'large' stations are identified by taking the six busiest stations in each of Network Rail's five regions (measured by passenger usage), and then adjusting to take account of the different distributions of station sizes between regions. This adjustment is such that there are slightly more than six large stations in the Southern region, and slightly fewer than six in both Scotland and Wales & Western.

⁴⁷ Table 3.1 of ORR conclusions. The large stations are also listed under Figure 8 of Appendix 9. The 32 stations provided here comprise the 'List' of large stations under a station specific calculation.

⁴⁸ Station specific or category averaged.

response to changing passenger usage over time. Network Rail expects, however, that the List of large stations will remain reasonably consistent from one control period to the next.

- 6.28 Further consideration to the potential impact of this change can be found in ORR's [impact assessment on access charges](#) which was produced to accompany its PR23 conclusions.

Approach to setting LTCs for new category averaged stations

Approach for PR23

- 6.29 At PR23, Network Rail will set the operational property element of LTCs for new stations under the category average LTC calculation at 10% of that for existing stations⁴⁹ which are in the same region and category, for a fixed five-year period from the date of opening. This is a change to the current operational property discount methodology and was confirmed in ORR's conclusions.
- 6.30 For the avoidance of doubt, the date of opening of a station is the same date on which the LTC commences; this is the date on which the first train carrying fare-paying passengers stops at the station (i.e. the date which the station opens to the public).
- 6.31 Once the five year discount period of a new station comes to an end, the station will move onto a higher LTC matching that of the existing stations in the same region and category, for the remainder of the control period.
- 6.32 Network Rail has a requirement to recover the total forecast maintenance, repair and renewals (MRR) expenditure for the control period, for all category averaged stations. Where at PR18 this recovery was at a route level⁵⁰, at PR23 control period costs for category averaged stations will be recovered at region level; this is in line with the move from route-based to region-based cost forecasting.
- 6.33 The SISS element of the LTC calculation methodology will remain unchanged and will be set by allocating the region-level total SISS expenditure between category average stations based on the relevant region's annual average SISS renewal cost over 35 years and in proportion to each station's individual long term annual renewal cost. This is consistent with the approach taken at PR18.

Impact of change

- 6.34 Due to Network Rail's requirement to recover the control period forecast costs⁵¹ at a region level, this change will have an impact on the LTCs for existing stations under the category average calculation, for cases where a new station has opened in the same region and category.
- 6.35 Each of the five regions will have a forecast for expenditure on operational property for category average stations throughout CP7. This forecast will include figures for both:

⁴⁹ Stations which have been open for five or more years.

⁵⁰ Split by the 8 former routes which existed in CP6.

⁵¹ For operational property and SISS, though the discount applies only to the operational property component.

- a) Existing category average stations (which opened before the beginning of CP6); and
- b) Any new category average stations which opened during CP6 (and therefore have an operational property discount running into CP7).

6.36 Table 10 shows a simplified example of the operational property expenditure forecast for a set of three existing stations which are all in the same region and category (for example, category D⁵²). Stations K – M all opened prior to the beginning of CP7 so are not classed as new.

Table 10: Example operational property expenditure forecast for 3 existing stations in the same region and category.

Operational property expenditure forecast WITHOUT new station - regional assumption (£)						
	CP7					Total
	Year 1	Year 2	Year 3	Year 4	Year 5	
Station K	10.0	10.0	10.0	50.0	10.0	90.0
Station L	10.0	10.0	10.0	10.0	10.0	50.0
Station M	10.0	200.0	10.0	10.0	10.0	240.0
Total K-N	30.0	220.0	30.0	70.0	30.0	380.0

6.37 It can be seen from Table 10 that the total operational property forecast expenditure for the region and category **without the addition of a new station** is £380; this is the amount that would be recovered across Stations K – M in CP7, with each of these three stations paying an annual operational property charge of $\frac{£380}{3 \times 5} = \frac{£380}{15} = £25.30$.

6.38 Table 11 shows the operational property expenditure forecast for the same region and category as in the example in Table 10, however in this example there is a new station (Station N) which has opened in the same region and category as Stations K – M. Station N opened two years before the end of CP6.

6.39 Note that the operational property forecast expenditure for Station N for CP7 **is included** in the CP7 total for all four stations in the region and category.

Table 11: Example operational property expenditure forecast for 3 existing stations and 1 new station in the same region and category.

Operational property expenditure forecast WITH new station - regional assumption (£)						
	CP7					Total
	Year 1	Year 2	Year 3	Year 4	Year 5	
Station K	10.0	10.0	10.0	50.0	10.0	90.0
Station L	10.0	10.0	10.0	10.0	10.0	50.0
Station M	10.0	200.0	10.0	10.0	10.0	240.0
Station N (new)	5.0	5.0	5.0	20.0	5.0	40.0
Total K-N	35.0	225.0	35.0	90.0	35.0	420.0

⁵² Categories A – F are defined in Appendix 10.

- 6.40 Table 11 shows that the total operational property forecast expenditure for the region and category with the addition of a new station is £420; this is the amount that must be recovered across Stations K – N in CP7 under the category average calculation.
- 6.41 If the operational property charge was split equally between the four stations for each year of CP7, each station would have an annual operational property charge of $\frac{£420}{4 \times 5} = \frac{£420}{20} = £21$.
- 6.42 Under the new category average calculation, the annual charge for each of the stations will not all be the same in all years of CP7. This is because Station N opened two years before the end of CP6, meaning its annual operational property charge for the first three years⁵³ of CP7 will be 10 % of the annual operational property charge for Stations K – M in CP7.
- 6.43 Table 12 is representative of the approach to the category average calculation which will be adopted in CP7 to take account of a new station within a given region and category.
- 6.44 It shows the annual breakdown of the operational property charge for Stations K – N throughout CP7. The values are set such that both of the following conditions are met:
- The annual charge for Station N for the first three years of CP7 is 10 % of the annual charge for Stations K – M throughout CP7.
 - The sum of all the annual charges for Stations K – N throughout CP7 is equal to £420 operational property forecast expenditure for the region and category.

Table 12: Example CP7 operational property LTC components for 3 existing stations and 1 new station (with a 3 year discount) with adjustment for regional recovery.

Operational property component of LTC - INCLUDING forecast recovery at regional level (£)						
	CP7					Total
	Year 1	Year 2	Year 3	Year 4	Year 5	
Station K	24.3	24.3	24.3	24.3	24.3	121.4
Station L	24.3	24.3	24.3	24.3	24.3	121.4
Station M	24.3	24.3	24.3	24.3	24.3	121.4
Station N (new)	2.4	2.4	2.4	24.3	24.3	55.8
Total K-N	75.3	75.3	75.3	97.1	97.1	420.0

- 6.45 Table 12 demonstrates that in order to recover the £420 forecast for the region and category in full, the annual operational property charge for existing Stations K – M would need to be increased from £21 to £24.30. This is an increase on the amount they would have been charged had the operational property charge been split equally between Stations K – N in each year of CP7.
- 6.46 Table 13 demonstrates the under-recovery of regional costs which would be seen if the operational property charge for existing stations is not adjusted to account for a new station (as shown in Table 12).

⁵³ Note that depending on when in CP6 a station opened, the discount may be between 1 and 5 years.

Table 13: Example CP7 operational property LTC components for 3 existing stations and 1 new station (with a 3 year discount) without adjustment for regional recovery.

Operational property component of LTC - EXCLUDING forecast recovery at regional level (£)

	CP7					Total
	Year 1	Year 2	Year 3	Year 4	Year 5	
Station K	21.0	21.0	21.0	21.0	21.0	105.0
Station L	21.0	21.0	21.0	21.0	21.0	105.0
Station M	21.0	21.0	21.0	21.0	21.0	105.0
Station N (new)	2.1	2.1	2.1	21.0	21.0	48.3
Total K-N	65.1	65.1	65.1	84.0	84.0	363.3

- 6.47 If existing Stations K – M were charged only £21 for their annual operational property⁵⁴, but Station N was still given a 90 % discount compared to the other three stations, for three years of CP7, the total cost recovery for the region and category would come to only £363.30. This is £56.70 short of the £420 operational property forecast expenditure which must be recovered in the category average methodology.
- 6.48 Further consideration to the potential impact of this change can be found in ORR’s [impact assessment on access charges](#) which was produced to accompany its PR23 conclusions.

Qualifying Expenditure (QX) charge

Approach for PR23

- 6.49 Following ORR’s decision not to regulate the fixed element of QX charge for managed stations, at PR23 it will continue to be agreed directly between Network Rail and passenger operators.
- 6.50 ORR will continue to review and approve the management fee element of the QX charge for managed stations.
- 6.51 Network Rail continues to work with passenger operators to agree the approach for the setting of a QX fixed fee for each managed station for each year of CP7.

Indexation

- 6.52 The stations LTC and QX charge will be subject to indexation by CPI annually, consistent with the approach taken in CP6 and consistent with ORR’s conclusions.

⁵⁴ As they would have been without the cost-recovery adjustment.

7 Summary of consultation questions

7.1 Table 14 lists all of the consultation questions throughout this paper, grouped by the section to which they refer.

Table 14: Full list of consultation questions.

Section	Question	
FTAC & ICC	1	Do you agree with Network Rail's proposal to simplify its fixed cost model? If not, please provide a detailed justification.
VUC	2	If you have any further changes to advise in relation to vehicle characteristics in advance of Network Rail's VUC recalibration, please do so in response to this consultation as there will be no further opportunity to do so.
	3	Where an operator hasn't already signified otherwise, do you agree with the removal of redundant vehicles from the CP7 price list? Do you have information as to why any of the vehicles which Network Rail propose to remove from the CP7 price list should instead be retained?
	4	Do you agree with Network Rail's proposal to limit refunds back to the start of the financial year in which a new or modified VUC rate is agreed? Please provide justification for your answer.
	5	Do you support Network Rail's proposed areas for review in advance of the next review of charges?
	6	Do you agree with Network Rail's proposal to continue to base charter and North Yorkshire Moors Railway (NYMR) VUCs in CP7 on the same typical train formations as were assumed for CP6? If not, please provide any evidence that you have of a more appropriate assumption.
	7	Do you agree with Network Rail's proposal to simplify the steam slot charge by introducing a single steam slot charge? Do you agree that a single steam slot charge should be calculated based on the proportion of journeys classified as 'steam under 250 miles' and 'steam over 250 miles'?
	EC4T	8
9		Please provide evidence and justification for Network Rail's consideration if you do not agree with Network Rail's proposal to remove Generic Consumption Rates for passenger operators in CP7.
10		Do you agree with Network Rail's proposal to remove freight Generic Consumption Rates and replace them with freight Default Consumption Rates, aligning nomenclature and methodology with passenger operator consumption rates? If not, please provide a justification for your response.
11		Do you agree with Network Rail's proposal to recalibrate DLSFs using the same methodology used at CP6? If not, please provide justification to support your position.
12		Do you agree with Network Rail's proposal to retain the existing CP6 Regenerative Braking Discounts for CP7?
EAUC	13	Do you agree with Network Rail's decision to adopt the cost variability assumptions previously determined at CP6 to recalibrate the EAUC rates? If not, please provide supporting evidence for any alternative suggestions.

Network Rail's consultation on regulated access charges in Control Period 7 (CP7):

Appendices

11 November 2022

Appendix 1 – List of Specified Operators paying FTACs in CP7

- 1.1 Table 15 comprises a list of specified operators that will continue to be charged a Fixed Track Access Charge (FTAC) in CP7.

Table 15: Specified operators paying FTAC in CP7

Specified operator
East Anglia
ScotRail
Arriva Rail London
Northern
Chiltern Railways
East Midlands Railway
Great Western
South Western Railway
Transpennine Express
Thameslink Railway
Keolis Amey Wales
London & South Eastern Railway
LNER
Merseyrail
MTR Crossrail
Caledonian Sleepers
C2C
Avanti West Coast
West Midlands Trains
CrossCountry

Appendix 2 – List of FTAC changes

- 2.1 Network Rail is proposing one minor change to its fixed cost model and the underpinning methodology with the intention of simplifying the size and complexity of the model without materially affecting the accuracy of the fixed cost allocation. This would be achieved by adopting a more direct approach to allocating costs between the various geographical sections of the network.
- 2.2 The change will greatly reduce the size and complexity of Network Rail's fixed cost model which in turn will improve its useability and transparency while reducing the potential for mathematical errors and making assurance more robust.
- 2.3 Table 16 contains the results of an impact analysis, both in £m and percentage change, of how the proposed model simplification would affect specified operators paying FTACs. The simplified fixed cost model was run using CP6 values and compared against the original maximum traffic-avoidable fixed cost allocation calculated by Network Rail's fixed cost model for CP6.
- 2.4 While the proposed simplification will bring benefits, the impact of the simplification is a relatively minor reduction in the perceived accuracy of the fixed cost allocation amongst operators, with 65 % of specified operators seeing a change of 1 % or less, 25 % seeing a change of between 1 % and 2 % and the remaining 10 % of specified operators seeing a change of between 2 % – 3.7 % (Table 16).

Table 16: Impact of proposed changes to Network Rail's Fixed Cost Model on Specified Operators' FTAC.

CP7 Specified Operator	£m Change	% Change
Transpennine Express	£ 0.871	1.1 %
East Anglia	-£ 0.675	-0.4 %
Northern	£ 2.101	1.0 %
Great Western	£ 0.240	0.1 %
CrossCountry	-£ 0.194	-0.2 %
West Midlands Trains	£ 0.600	0.5 %
Arriva Rail London	-£ 0.773	-1.4 %
East Midlands Railway	£ 0.776	0.7 %
Caledonian Sleepers	£ 0.104	1.6 %
Thameslink Railway	-£ 0.047	0.0 %
MTR Crossrail	£ 1.595	3.7 %
ScotRail	£ 4.574	2.5 %
LNER	-£ 1.135	-0.8 %
Merseyrail	£ 0.156	0.4 %
Avanti West Coast	-£ 1.280	-0.7 %
Keolis Amey Wales	£ 1.711	2.0 %
Chiltern Railways	£ 0.463	1.5 %
C2C	-£ 0.012	0.0 %
London & South Eastern Railway	-£ 0.599	-0.4 %
South Western Railway	-£ 0.401	-0.2 %

Appendix 3

Network Rail's Vehicle Usage Charge (VUC) model

November 2022

Version 1.0

Variable Usage Charge (VUC) model methodology

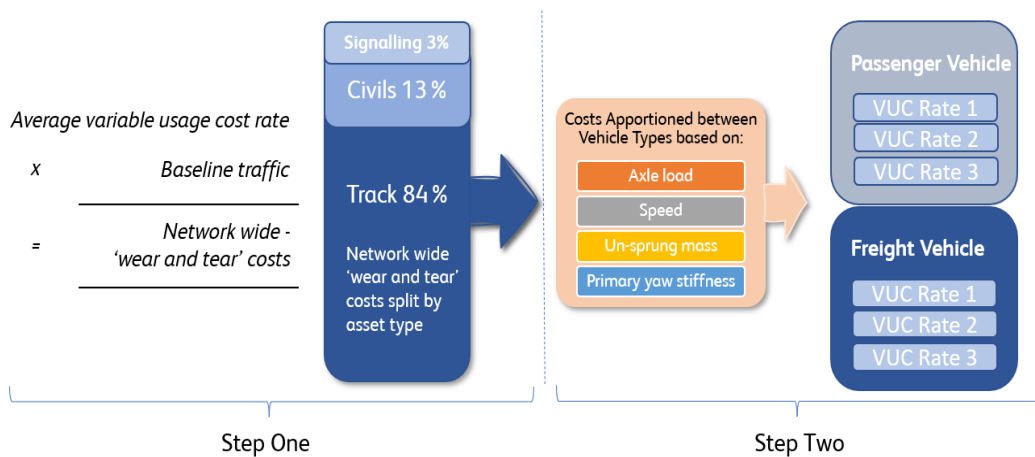
- 3.1 The purpose of this document is to explain the current methodology Network Rail uses in its Variable Usage Charge (VUC) Excel model to recalibrate VUCs for CP7. The methodology detailed is consistent with ORR's October 2022 charging conclusions document for CP7.
- 3.2 The methodology and VUC model is also used to calculate new VUCs requested by operators during the Control Period and so this document should be read in conjunction with Network Rail's ['VUC Guidance document'](#)⁵⁵ which explains that process, and the inputs required, in more detail.
- 3.3 Several ['Ready Reckoners'](#) are available for operators on Network Rail's 'CP6 VUC guidance section' of its website, designed to help them understand how different vehicle characteristics impact on the VUC rate for proposed new or modified vehicles.
- 3.4 We will continue to refine and enhance this guidance document by working closely with stakeholders to continue to improve transparency and general understanding of the VUC modelling process.

The Variable Usage Charge (VUC) recalibration process

- 3.5 Broadly speaking, the process for recalibrating VUC rates comprises two steps:
 - a) **Step one: Estimating our total variable usage costs.** This stage involves estimating a single national average variable usage cost rate for passenger and freight traffic on a £ per 1,000 gross tonne mile basis. This rate can then be multiplied by a given traffic level in order to estimate our total variable usage costs.
 - b) **Step two: Apportioning our total variable usage costs between different vehicle types.** This apportionment is carried out using damage formulae designed to estimate the 'wear and tear' impact of different types of vehicle base on their characteristics (e.g. weight, speed and unsprung mass).
- 3.6 Figure 4, below, illustrates this process:

⁵⁵ Current version of this document reflects CP6 Guidance. This will be updated in advance of CP7.

Figure 4 – VUC 2 step process



Step one: Estimating total VUC costs

3.7 In order to estimate our total VUC costs we will:

- a) **Estimate track variable usage costs ‘bottom up’ using the Vehicle Track Interaction Strategic Model (VTISM).** VTISM is an engineering model, owned by RSSB, which uses engineering science to predict track degradation and the remedial effects of heavy maintenance and renewal. We will continue to use VTISM to estimate how track maintenance and renewal costs vary in response to small changes in traffic levels in order to derive an average track VUC cost rate per 1,000 gross tonne miles.
- b) **Estimate non-track variable usage costs ‘top down’ using the same cost categories and cost variability assumptions as were applied in PR18.** Unlike track costs, for non-track assets we do not have a model capable of forecasting how our maintenance and renewal costs vary in response to small changes in traffic levels. Therefore, for these asset categories we will continue to rely on expert engineering judgement to estimate variable usage costs. We will retain the below CP6 assumptions in relation to the proportions of non-track asset costs assumed to be variable with traffic levels:

Table 17: VUC costs % that vary with traffic

Asset category	Variability percentage
Embankment renewals	6 %
Metallic underbridge renewals	20 %
Brick and masonry underbridge renewals	35 %
Culvert renewals	5 %

Asset category	Variability percentage
Signalling maintenance	6 %
Signalling minor works points renewals	44 %

Step two: Apportioning total VUC costs between different vehicle classes

3.8 The current methodology for allocating VUC costs between railway vehicles is described, below.

Split between vertical and horizontal track costs

3.9 Track VUC costs comprise costs related to vertical track forces and horizontal track forces. These vertical and horizontal track VUC costs have different cost drivers and are, therefore, allocated to vehicles using different methodologies. These different methodologies are set out below.

3.10 However, before these different cost allocation methodologies are applied it is necessary to make an assumption in relation to the proportion of track VUC costs which relate to vertical and horizontal track costs respectively.

3.11 We will be retaining the historically applied split of VUC costs which assumes that:

- a) **70%** of costs relate to **vertical forces**; and
- b) **30%** of costs relate to **horizontal forces**.

Vertical track costs allocation methodology

3.12 As noted above, 70 % of track VUC costs are assumed to relate to vertical track forces. These costs are allocated between vehicles using the following damage formula developed by Serco in PR13.

Track damage formula =

$$Ct * (0.473 * e^{0.133A} + 0.015 * S * U - 0.009 * S - 0.284 * U - 0.442) * \frac{gtm}{A}$$

Where:

- Ct is 0.89 for loco-hauled passenger stock and multiple units and 1 for all other passenger vehicles, relevant suspension factor for freight
- A is Axle load (tonnes)
- S is Operating speed (mph)
- U is Unsprung mass (tonnes per axle)
- gtm is gross tonne miles

3.13 This formula is designed to estimate the relative ‘wear and tear’ that different vehicles impose on track assets. In summary, the damage formula calculates a damage score for each vehicle class based on its respective characteristics e.g. axle load, operating speed and

unsprung mass. The higher the damage score the more vertical track VUC costs the vehicle class attracts.

Horizontal track costs allocation methodology

- 3.14 The remaining 30 % track VUC costs relate to horizontal track costs. The existing process to determine horizontal track costs associates each vehicle with a ‘curving class’. A curving class is a measure of a vehicle’s ‘track friendliness’ with regard to tangential forces generated in the contact patch. These are the forces responsible for rail wear and rolling contact fatigue (RCF). In the current methodology these forces are determined for the vehicle running on a range of curves representing those existing in the GB network and for each curve radius. The forces are used to determine a measure of the wear and RCF damage generated by the vehicle. These measures of damage are then converted to a cost and weighted by the proportion of curves of that radius on the national network. These costs are then summed to provide a national average cost per mile.
- 3.15 The wheel/rail forces used as a fundamental input to the calculations must be derived from vehicle dynamics simulations for each specific vehicle. These can be obtained from either a full simulation of the actual vehicle, or from a ‘look-up’ table of pre-calculated values for a range of vehicles. The range of pre-calculated values are based on vehicle weight and primary yaw stiffness, and the operator should use the one that most closely reflects its characteristics (rounded up). The generic passenger curving classes typically use the following naming convention “Coach_XX_YY”, where “XX” is the primary yaw stiffness (in MNm/rad) and “YY” is the weight in tonnes.

Civils costs allocation methodology

- 3.16 Civils costs comprise approximately 10 % of total VUC costs. These costs are allocated between vehicles using the following damage formula:

Civils damage formula = $Ct * A^3 * S^{1.52} * kgtm$

Where:

Ct is a constant: 1.20 for two-axle freight wagons, and 1 for all other vehicles
A is the axle load (tonnes)
S is the operating speed (miles/hour)
kgtm is 1000 gross tonne miles

- 3.17 Like the track damage formula, this formula is designed to estimate the relative ‘wear and tear’ that different vehicles impose on civils assets. In summary, the formula calculates a damage score for each vehicle class based on its respective characteristics (e.g. axle load, speed and unsprung mass) and the higher the damage score the more civils VUC costs the vehicle class attracts.

Signalling costs allocation methodology

- 3.18 Signalling costs comprise approximately 5 % of total VUC costs. Half of these costs, which are assumed to be load related, are allocated using the track damage formula set out,

above. The remaining 50 % are allocated based on vehicle miles on the basis that they are assumed to relate solely to vehicle movements, rather than load.

Passenger operating speed formula

3.19 The assumed operating speed of a vehicle affects the variable usage costs allocated to that vehicle because the speed assumption feeds into the track and civils' damage formulae described, above. In simple terms, the greater the assumed operating speed the more 'wear and tear' that the vehicle is estimated to cause on the network. It is important to note that costs are allocated based on the vehicles assumed operating speed, not its assumed maximum speed. The following formula is used to estimate a vehicle's typical operating speed, based on its maximum:

$$\text{Operating Speed} = 0.021 * \text{Max Speed}^{1.71}(\text{mph})$$

3.20 The assumed maximum speed for each passenger vehicle type is based on:

- a) the maximum speed that vehicle type is capable of;
- b) the maximum line speed over the route on which they operate if it's lower than the maximum speed that their vehicle type is capable of; or
- c) a more representative operating speed based on analysis of the time timetable, if operators consider that the formula which converts their vehicles' maximum speed into an operating speed gives rise to a materially inaccurate result.

3.21 Operators should note that while option 3.20 b) can be applied to existing vehicles as part of the Periodic Review process in advance of the publication of Network Rail's VUC price list, it can only be applied to **new** vehicles which do not appear the price list if an operator is looking to apply for a new VUC rate during the Control Period, as stated clearly in the [Network Rail's VUC guidance](#).

Assumed freight operating speeds

3.22 As noted, above, the assumed operating speeds of vehicles feed into the track and civils damage formulae and, therefore, affect the allocation of VUC costs. In simple terms, the higher the assumed operating speed the more VUC costs allocated to the relevant vehicle type.

3.23 The assumed average operating speed for each freight commodity is set out below. These speeds were agreed with industry at PR13 and are average speeds for laden and unladen journeys, excluding dwell time⁵⁶.

⁵⁶ Dwell time is the time that the train spends stationary at stopping locations such as stations and passing loops, usually planned into a schedule for operational or timetabling purposes.

Table 18: Freight commodities and average speeds for the purposes of VUC calculation

Commodity	Average Speed excluding dwell time (mph)
Coal (other)	25
Iron Ore	25
Steel	25
Domestic Waste	24
Construction Materials	29
Petroleum	23
Coal (ESI)	24
European Intermodal	38
Domestic Automotive	25
European Automotive	31
Industrial Minerals	18
General Merchandise	30
Royal Mail	78
Mail and Premium Logistics	78
Domestic Intermodal	33
Enterprise	27
European Conventional	31
Other	25
Biomass	34
Chemicals	16

Appendix 4 – Key Changes to the Variable Usage Charge (VUC) at PR18

- 4.1 There were 3 key changes to the VUC between CP5 and CP6. Firstly, all operators were given the opportunity to review the vehicle characteristics underpinning their VUC rates. While this was included as a specific review component of the CP5 periodic review process, in CP6, giving operators this opportunity became embedded in the process as it was felt that it served to materially improve the accuracy of vehicles' VUC rates.
- 4.2 Secondly, the option of basing the assumed route-based maximum speed of a passenger vehicle on the maximum line speed of the routes over which it operates (ignoring any temporary speed restrictions), rather than the maximum speed that the vehicle is capable of, was introduced. This option was available for new or existing vehicles for the PR18 VUC recalibration but only available for new vehicles not on the CP6 Pricelist after the start of the control period. Where different passenger operators operate the same vehicle class on different routes and are limited to different maximum line speeds, Network Rail introduced the option of having two (or more) separate VUC rates.
- 4.3 A number of vehicles were subsequently published on the CP6 price list where they are calibrated using a route-based maximum speed. The comparison between the VUC rates calculated using a route-based maximum speed and the assumed maximum speed of the vehicle is illustrated in Table 19. Vehicles with a speed suffix in brackets e.g. (100), are those which have been calculated using a route-based maximum speed. Network Rail anticipates a further uplift in the use of this option at CP7 following the opportunity for operators to review the characteristics of their existing vehicles. Network Rail supports the continued calibration of VUCs where this set of circumstance applies⁵⁷ as it returns a more cost reflective VUC.

⁵⁷ Each operator is only allowed one VUC rate per vehicle class because Network Rail's billing system is not capable of applying different rates when the same vehicle runs on different parts of the network.

Table 19: VUC based of Route maximum speed vs existing VUC.

Vehicle	2017/18 price (£)	
350/2/M	£	0.1368
350/2/M (110)	£	0.1460
350/2/T	£	0.1091
350/2/T (110)	£	0.1160
357/3/M	£	0.0914
357/3/M (75)	£	0.0780
357/3/T	£	0.0872
357/3/T (75)	£	0.0757
357/M	£	0.0958
357/M (75)	£	0.0818
357/T	£	0.0945
357/T (75)	£	0.0819
387/M	£	0.1165
387/M (75)	£	0.0917
387/T	£	9.9900
387/T (75)	£	0.0803

- 4.4 Lastly, prior to CP6, where there have been several variants of motor and trailer vehicles within each class, the VUC price list has not distinguished between these variants. At CP6 the option for operators to seek more than one VUC rate for multiple unit motor/trailer vehicles within a vehicle class was introduced to reflect the fact that the introduction of newer vehicles has resulted in, for example, distributed traction. In addition, it has become increasingly common for the same multiple units to run with different vehicle formations (e.g. as 5-car or 8-car trains) comprising different variants of motor/trailer vehicles.

Appendix 5 – Approach to excluding indirect costs from VUCs

5.1 This appendix sets out Network Rail’s proposed approach to excluding ‘indirect costs’ from Variable Usage Charges (VUCs) in Control Period 7 (CP7).

Legislation governing the definition of direct and indirect costs

5.2 The 2016 Access & Management Regulations (A&MR) require VUCs to be set at the level of ‘direct costs’, i.e. *‘the cost that is directly incurred as a result of operating the train service’*.⁵⁸

5.3 The A&MR further require that direct costs are calculated in accordance with the provisions set out in the European Commission’s 2015/909 Implementing Regulation (EC IR).⁵⁹ The EC IR states that:

- a) direct costs can be based on the infrastructure manager’s assessment of the marginal costs it in its provision of the minimum access package and access to infrastructure connecting service facilities;⁶⁰ but that
- b) certain cost categories are explicitly prohibited from inclusion within the calculation of direct costs under any circumstances, even if they are included within the infrastructure manager’s assessment of marginal costs, including costs relating to:⁶¹
 - i. network-wide overheads, including overhead salaries and pensions;
 - ii. land;
 - iii. financing;
 - iv. technological progress or obsolescence; and
 - v. intangible assets.

Approach to ensuring exclusion of indirect costs

5.4 At PR18, Network Rail adopted a two-step process to incorporating these requirements into its calculation of VUC:

5.5 Step 1 (as applied at PR13 and previous Periodic Reviews)

- a) Network Rail calculated total costs in £m for each asset category (‘track renewals’; ‘track maintenance’; ‘embankments renewals’; etc);

⁵⁸ Paras 1(4), Schedule 3, 2016 Access & Management Regulations

⁵⁹ Paras 1(5), Schedule 3, 2016 Access & Management Regulations

⁶⁰ Recital 12, European Commission’s 2015/909 Implementing Regulation

⁶¹ Article 4, European Commission’s 2015/909 Implementing Regulation

- b) Network Rail then estimated the proportion of the cost of each asset category that is driven by the wear and tear caused by traffic i.e. the proportion that is 'marginal', in the language of A&MR; and
- c) multiplied (a) by (b) to arrive at an estimate of 'marginal cost' in £m for each asset category.

5.6 Step 2 (newly introduced at PR18 to comply with the EC IR)

- a) Network Rail split the total cost of each asset category into components (e.g. 'contractor costs'; 'project management costs'; etc), to identify any component where:
 - i. the component does not vary with the wear and tear caused by traffic (i.e. does not contain marginal costs);
 - ii. the component contains cost categories that are explicitly prohibited by the EC IR (e.g. 'network-wide overheads')
- b) Network Rail then reduced its estimates of marginal cost from Step 1 to reflect the proportion of total costs associated with any component that met either of these two tests.

5.7 To help illustrate the process, the methodology is applied to figures for signalling maintenance as follows:

5.8 Step 1

- a) Network Rail calculated total costs of £168m a year;⁶²
- b) It then estimated that 6.0 % of signalling maintenance costs vary with traffic and are marginal; and
- c) multiplied £168m by 6.0 % to arrive at an estimate of marginal costs of £10.1m a year.

5.9 Step 2

- a) Network Rail estimated that:
 - i. the 'indirect staff costs' component, comprising 15.9 % of total costs, does not vary with traffic;
 - ii. the 'other operating cost' component, comprising 2.6 % of total costs, includes cost categories explicitly prohibited by the EC IR

⁶² 2017/18 prices

- b) this implied a reduction to Network Rail's estimate of marginal cost of £10.1m from Step 1 by 18.6 %, to £8.2m a year.

5.10 In its April 2022 consultation, ORR confirmed that it is content with the approach Network Rail took to step 2 (a) at PR18, and the associated estimates.⁶³ Network Rail proposes retaining the same approach for our PR23 recalibration.

5.11 However, upon reflection, Network Rail believes it has identified an error in the way these estimates were reflected in the modelling at Step 2(b). Specifically, Step 2(b) seeks to adjust estimates of marginal cost - a measure that by its nature already only includes costs that vary with traffic. Therefore, while it is correct to adjust those estimates for costs categories explicitly prohibited by the EC IR, it is not correct to adjust those estimates for costs that do not vary with traffic, since such costs are already excluded from the marginal cost estimates. To put this in terms of the signalling maintenance example set out above:

- a) Network Rail estimated that 6.0 % of total costs vary with traffic, leading to a marginal cost estimate of £10.1m a year;
- b) Network Rail's approach to arriving at that 6.0 % did not consider cost categories explicitly prohibited by the EC IR - since cost components including such costs comprise 2.6 % of total costs, it seems reasonable (if conservative) to reduce the £10.1m by 2.6 %;
- c) but, Network Rail's approach to arriving at that 6.0 % did consider which costs are driven by traffic - the fact that cost components that do not vary with traffic comprise 15.9 % of total costs suggests that it is included within the 94.0 % of total costs that are not reflected in our 6.0 % marginal cost estimate, but is not a reason to reduce the £10.1m by a further 15.9 %; to do so would under-state marginal costs allowable under the EC IR. As noted by ORR, this would not be consistent with the A&MR.⁶⁴

5.12 For PR23 therefore, Network Rail propose correcting this modelling error by adjusting, in Step 2(b), only for components which contain cost categories that are explicitly prohibited by the EC IR.

5.13 The impact of this change in approach is summarised in Table 20.

⁶³ Paras 3.18 to 3.21, *PR23 – Review of Network Rail's access charges - Technical consultation - Further proposals*, ORR, 14 April 2022

⁶⁴ Paragraph 1.20, *PR23 - Review of Network Rail's access charges - Technical consultation - Further proposals*, ORR, 14 April 2022

Table 20: Reductions to marginal cost estimates.

Asset category	PR18 approach	PR23 approach
Track maintenance	17.6 %	2.0 %
Track renewals	5.2 %	5.2 %
Civils renewals - embankments	10.6 %	10.6 %
Civils renewals - metallic underbridges	9.6 %	9.6 %
Civils renewals - brick and masonry underbridges	6.5 %	6.5 %
Civils renewals - culverts	7.8 %	7.8 %
Signalling maintenance	18.6 %	2.6 %
Signalling renewals - minor works points	5.2 %	5.2 %
Total	9.3 %	4.6 %

5.14 Supporting tables for each asset category are provided on the following pages.

Asset category breakdown

Asset Category - Track maintenance

Cost category	Description	PR18 % of Asset category	PR18 assessment of cost (not reviewed for PR23)	PR18 adjustment to marginal cost		PR23 adjustment to marginal cost	
Direct costs attributable to Activity Based Planning (ABP) standard jobs	Direct labour costs and 'time on tools' associated with Network Rail staff. Costs are broken down into 140 activities in ABP model (tamping, stoneblowing, grinding, etc).	15.9%	An increase in traffic would mean that assets wear out more quickly, resulting in more 'time on tools' carrying out maintenance work.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Direct Costs attributable to non-ABP jobs and NTOT	Costs which fall outside the 140 activities in the ABP model and non-time on tools and capex hours (e.g. manual correction of track geometry).	30.0%	An increase in traffic would mean that assets wear out more quickly, resulting in more 'time on tools' carrying out maintenance work. If an increase in traffic resulted in more 'time on tools' it would also result in more 'non-time on tools'. If additional trains reduced access windows this would also drive an increase in 'non-time on tools'.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Direct costs attributable to plant	Costs associated with tamping, stoneblowing, grinding machines, etc.	18.6%	An increase in traffic would mean that track assets wear out more quickly, resulting in more maintenance work using on-track machines.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Other operating income	Network Rail high speed income, telecoms income, utilities recoveries, etc	(0.6%)	This income would not increase if traffic increased.	Does not vary with traffic, but negative number already removed from marginal cost - no further adjustment	N/A	Marginal cost already excludes income that does not vary with traffic - no further adjustment	N/A
Indirect staff	Employment costs of supervisors and		The number of managers and	Does not vary with		Marginal cost	

Cost category	Description	PR18 % of Asset category	PR18 assessment of cost (not reviewed for PR23)	PR18 adjustment to marginal cost		PR23 adjustment to marginal cost	
costs	management for front line maintenance staff.	15.6%	supervisors would not increase as a result of a small change in traffic levels.	traffic - remove	15.6%	already excludes costs that do not vary with traffic - no further adjustment	N/A
Labour Related off-charges / recoveries	Capex recoveries (other possessions), cross maintenance, labour off-charges, etc. Cost of using maintenance teams to deliver capex.	(0.6%)	May not be directly related to 'wear and tear' from train services.	May not vary with traffic, but negative number already removed from marginal cost - no further adjustment	N/A	Marginal cost already excludes income that does not vary with traffic - no further adjustment	N/A
Net contractor costs	Specialist contractors, labour contractors, etc	4.6%	An increase in traffic would mean that assets wear out more quickly, resulting in more spending on contractors carrying out maintenance work.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Net materials	Ballast, rail, sleepers, freight haulage, etc	9.6%	An increase in traffic would mean that assets wear out more quickly, resulting in more spending on materials to carry out maintenance work.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Net plant	Wheeled plant, small plant, vehicle costs, etc	8.1%	An increase in traffic would mean that assets wear out more quickly, resulting in more use of plant to carry out maintenance work.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Other operating costs	Accommodation and property costs, other overheads (e.g. legal, IT, HR), other employee related costs (e.g. training and PPE)	2.0%	Property costs and corporate overhead costs will not vary with small changes in traffic levels. However, employee related costs would vary if the increased train movements resulted in increased labour costs.	Includes some costs that do not vary with traffic and some network-wide overheads (prohibited by EC IR) - remove all to be conservative	2.0%	Includes some network-wide overheads, prohibited by EC IR - remove all to be conservative	2.0%
Direct staff: labour recoveries	Capex recoveries (other possessions), cross maintenance labour off-charge etc. Recharges where maintenance staff	(3.2%)	May not be directly related to 'wear and tear' from train services.	May not vary with traffic, but negative number already removed from	N/A	Marginal cost already excludes income that does not vary with traffic -	N/A

Cost category	Description	PR18 % of Asset category	PR18 assessment of cost (not reviewed for PR23)	PR18 adjustment to marginal cost		PR23 adjustment to marginal cost	
	deliver capex.			marginal cost - no further adjustment		no further adjustment	
Total removed from marginal cost					17.6%		2.0%

Asset Category - Track renewals

Cost category	Description	PR18 % of Asset category	PR18 assessment (not reviewed for PR23)	PR18 adjustment to marginal cost		PR23 adjustment to marginal cost	
Contractors	Main contractors undertaking conventional and High Output plain line and S&C track renewals via framework agreements. Includes contractors' own labour, plant, 'small' materials and subcontract costs as well as their project management, overheads and profit.	49.3%	More traffic would mean that assets wear out earlier, resulting in earlier renewals (including all contractor costs).	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Design and track bed investigation	Internal charges to projects for costs of Network Rail design teams (Track Design Group, Signalling Design Group etc) and Track Bed design team specifying renewals work required as a result of wear and tear to the infrastructure. Typically GRIP stage 3-5 costs.	2.3%	More renewals work would result in more design staff.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
High output tier 2 directs	Subcontractor costs for the supply of labour and road rail vehicles to support the High Output systems. (The High Output machines themselves are owned by Network Rail.)	0.0%	More traffic would mean that assets wear out earlier, resulting in earlier renewals (including all contractor costs).	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Route service s - supply chain	Engineering freight haulage, 'heavy' materials delivered by freight operators (rail, sleepers, ballast, S&C units) and On Track machines provided by Route Services / Supply Chain organisation.	39.2%	More traffic would mean that assets wear out earlier, resulting in earlier renewals.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Other directs	Minor works carried out on-site directly related to or supporting track renewals. Temporary land access costs, support from local maintenance teams when providing OLE / conductor rail isolations and other miscellaneous	4.1%	A volume driven cost category so more work would mean more of these costs.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A

Cost category	Description	PR18 % of Asset category	PR18 assessment (not reviewed for PR23)	PR18 adjustment to marginal cost		PR23 adjustment to marginal cost	
	support.						
Possession management	Labour costs for Network Rail Persons in Charge of Possession (PICOPs), Senior Persons in Charge of Possession (SPICOPs) and other staff (e.g. barrier men) to take and manage the possessions within which contractors / deliverers are responsible for managing their own worksites. Does not include Schedule 4 or Schedule 8 compensation payments to operators.	1.4%	A volume driven cost category so more work would mean more of these costs.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Recharge out direct	Recharges to other projects or funders for on site non track renewals works undertaken on their behalf (e.g. removing some scrap rail that should have been removed previously).	(1.5%)	May not be directly related to 'wear and tear' from train services.	May not vary with traffic, but negative number already removed from marginal cost - no further adjustment	N/A	Marginal cost already excludes income that does not vary with traffic - no further adjustment	N/A
Network Rail management	IP Track management costs. The cost of Network Rail people and expenses, accommodation, IP HQ overheads and Network Rail corporate/group overheads. Includes the costs of managing projects through the GRIP lifecycle. More 'white collar' than 'blue collar'. Making sure access is booked sufficiently in advance, managing designers and contractors.	5.2%	This cost category will include a proportion of IP HQ costs (e.g. IP Finance & HR & Commercial and Development who set policy and standards).	Includes some network-wide overheads, prohibited by EC IR - remove all to be conservative	5.2%	Includes some network-wide overheads, prohibited by EC IR - remove all to be conservative	5.2%
Total removed from marginal cost					5.2%		5.2%

Asset Category - Civils renewals

(cost splits shown separately for embankments, metallic underbridges, brick and masonry underbridges, culverts and total)

Cost category	Description	PR18 % of Asset category	PR18 assessment (not reviewed for PR23)	PR18 adjustment to marginal cost		PR23 adjustment to marginal cost	
Contractors' direct costs	Costs that contractors and sub-contractors expend on site (labour, plant, materials, etc) to carry out construction works (e.g. replacing a bridge deck).	45.4 % 59.3 % 61.8 % 54.7 % 53.7 %	More traffic means that structures would be replaced earlier, resulting in higher contractor costs.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Design	Includes architects, engineers and technology specialists responsible for the conceptual design aspects and their development into drawings, specifications and instructions required for renewal of the rail infrastructure works or facility and associated processes. Directly linked to contractor direct costs. Renewals may not be like-for-like. For example a different specification bridge may be a better whole-life cost solution, particularly if traffic flows are likely to change in the future.	12.9 % 5.6 % 6.0 % 10.7 % 8.7 %	More renewals drives the need for more designers to develop the renewals.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Project management	Employer, project manager, quantity surveyor / cost manager, and all other consultants responsible for the delivery of the infrastructure project on time, on cost and to the required performance criteria (design and quality). Costs allocated to specific projects.	7.3 % 7.2 % 4.2 % 2.7 % 6.9 %	Will include HQ costs and some non-specific project costs (e.g. buildings and services). A proportion of these costs will be directly related to managing the renewal project. However, this cost category will also include some national overhead costs.	Includes some network-wide overheads, prohibited by EC IR - remove all from marginal cost to be conservative	7.3 % 7.2 % 4.2 % 2.7 % 6.9 %	Includes some network-wide overheads, prohibited by EC IR - remove all from marginal cost to be conservative	7.3 % 7.2 % 4.2 % 2.7 % 6.9 %
Main contractors' preliminaries	Main contractors' costs specific to a project which cannot be allocated to a specific element, sub-element or component or the project. Includes costs associated with management	31.1 % 25.5 % 25.7 % 26.7 %	More renewals results in more projects and more of these costs. wide costs.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A

Cost category	Description	PR18 % of Asset category	PR18 assessment (not reviewed for PR23)	PR18 adjustment to marginal cost		PR23 adjustment to marginal cost	
	and staff, site establishment, temporary services, security, safety and environmental protection, control and protection, common user mechanical plant, common user temporary works, the maintenance of site records, completion and post-completion requirements, cleaning, fees and charges, sites services and insurances, bonds, guarantees and warranties. Excludes costs associated with subcontractors' preliminaries, which are included in the unit rates applied to infrastructure works.	27.8 %					
Other project costs	Costs not necessarily directly associated with the cost of constructing infrastructure works, but forming part of the total cost of the rail infrastructure project (e.g. land acquisition costs and marketing costs).	3.3 % 2.4 % 2.3 % 5.1 % 2.9 %	Land acquisition is explicitly prohibited by EC IR. Includes marketing and insurance costs which are more network wide than project specific. Would also include rental of land access which would be excluded under land acquisition.	Includes some network-wide overheads and land acquisition, prohibited by EC IR - remove all from marginal cost to be conservative	3.3 % 2.4 % 2.3 % 5.1 % 2.9 %	Includes some network-wide overheads and land acquisition, prohibited by EC IR - remove all from marginal cost to be conservative	3.3 % 2.4 % 2.3 % 5.1 % 2.9 %
Total removed from marginal cost					10.6% 9.6% 6.5% 7.8% 9.7%		10.6% 9.6% 6.5% 7.8% 9.7%

Asset Category - Signalling maintenance

Cost category	Description	PR18 % of Asset category	PR18 assessment (not reviewed for PR23)	PR18 adjustment to marginal cost		PR23 adjustment to marginal cost	
Direct costs attributable to ABP standard jobs	Direct labour costs and 'time on tools' associated with Network Rail staff. Costs are broken down into activities in BRT's ABP model (train protection, level crossings, etc).	25.5%	An increase in traffic would mean that assets wear out more quickly, resulting in more 'time on tools' carrying out maintenance work.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Cost of non ABP standard jobs	Direct labour costs and 'time on tools' associated with Network Rail staff for activities which fall outside the ABP model.	3.5%	An increase in traffic would mean that assets wear out more quickly, resulting in more 'time on tools' carrying out maintenance work.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Cost of non OPEX hours for signalling teams	Non-'time on tools' and capex hours	43.4%	An increase in traffic resulting in more 'time on tools' will also result in more 'non-time on tools'. If additional trains reduce access windows this will also drive an increase in 'non-time on tools'.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Labour related off-charges / recoveries	Capex recoveries (other possessions), cross maintenance labour off-charge etc. Cost of using maintenance teams to deliver capex.	(5.5%)	May not be directly related to 'wear and tear' from train services.	May not vary with traffic, but negative number already removed from marginal cost - no further adjustment	N/A	Marginal cost already excludes income that does not vary with traffic - no further adjustment	N/A
Net contractor costs	Specialist contractors, labour contractors, etc	1.6%	An increase in traffic would mean that assets wear out more quickly, resulting in more spending on contractors to carry out maintenance work.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Net materials	Freight haulage, switches and crossing costs, etc	10.1%	An increase in traffic would mean that assets wear out more quickly, resulting in more spending on materials to carry out maintenance work.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Net plant	Wheeled plant, small plant, vehicle costs, etc	3.1%	An increase in traffic would mean that assets wear out more quickly, resulting in more use of plant more to carry out maintenance work.	Varies with traffic - no further adjustment	N/A	As per PR18	N/A
Other	Network Rail high speed income,	(0.2%)	This income would not increase if	Does not vary with	N/A	Marginal cost	N/A

Cost category	Description	PR18 % of Asset category	PR18 assessment (not reviewed for PR23)	PR18 adjustment to marginal cost		PR23 adjustment to marginal cost	
operating income	telecoms income, utilities recoveries, etc		traffic increased.	traffic, but negative number already removed from marginal cost - no further adjustment		already excludes income that does not vary with traffic - no further adjustment	
Other operating costs	Accommodation and property costs, other overheads (e.g. legal, IT, HR), other employee related costs (e.g. training and PPE)	2.6%	Property costs and corporate overhead costs will not vary with small changes in traffic levels. However, employee related costs would vary if the increased train movements resulted in increased labour costs.	Includes some costs that do not vary with traffic and some network-wide overheads, prohibited by EC IR - remove all to be conservative	2.6%	Includes some network-wide overheads, prohibited by EC IR - remove all to be conservative	2.6%
Indirect staff costs	Employment costs of supervisors and management for front line maintenance staff.	15.9%	The number of managers and supervisors would not increase as a result of a small change in traffic levels.	Does not vary with traffic - remove	15.9%	Marginal cost already excludes costs that do not vary with traffic - no further adjustment	N/A
Total removed from marginal cost					18.3%		2.6%

Appendix 6 – Proposal for a Single Steam Slot Charge

Purpose of report

- 6.1 The purpose of this report is to determine the most appropriate methodology in determining a single steam slot charge by analysing the proportion of charter operator's business which is 'Steam' and defined as either 'Steam **Over** 250 Miles' or 'Steam **Under** 250 Miles'.

Data

- 6.2 The analysis in this report was carried out using data (the Data) obtained from the Track Access Billing team. Due to the heavy impact of COVID-19 on charter operator's business in 2020/21 and 2021/22, data has been selected from Periods 1- 3 in 2019/20 and Periods 1-3 2022/23 for those charter companies who have operated steam services over the Control Period, namely:
- a) DB Cargo (UK) Limited;
 - b) Locomotive Services Ltd;
 - c) Vintage Trains; and
 - d) West Coast Railway

Background

- 6.3 Slot charges aim to recover the cost of activities which we specifically undertake for charter services and are not otherwise funded for. These costs include gauging activities and operational costs (e.g. paying staff to operate ground frames for charter trains to access branch lines).
- 6.4 Unlike diesel or electric hauled charter services, steam hauled charter services attract a different slot charge dependant on whether they are defined as 'over' or 'under' 250 miles. Those charges are illustrated in Table 21.

Table 21: Existing Slot Charges

Description of Service	Total journey length including ECS mileage not exceeding 250 miles (£, 2017/18 prices)	Total journey length including ECS mileage exceeding 250 miles (£, 2017/18 prices)
Train hauled by Diesel or Electric Equipment or consisting of EMU or DMU	343.2427	343.2427
Train hauled throughout or in part by Steam Driven Equipment	613.1715	858.6621

- 6.5 The logic behind the differential between the steam slot charges and the diesel slot charge historically, is due to the additional costs which Network Rail only incurs as a result of facilitating the operation of steam locos on the network, for example, bespoke gauging activities. Most steam locos are unique in their attributes making it more labour intensive when assessing a steam bid against the capability of the route being bid for.
- 6.6 Presumably, in an effort not to over complicate the charter charging regime, it was felt that 2 charges were sufficient to draw the distinction between the workloads associated with relatively short steam journeys (under 250 miles) versus those of a longer nature (over 250 miles).
- 6.7 However, in responding to customer demand, NR no longer undertakes gauging activities on a journey-by-journey basis and subcontracts gauging work externally, for a year in advance, for all steam locos to give steam operators certainty with regards to route compatibility. This allows them to plan with greater efficiency and certainty.

Proposed charges reform

- 6.8 As we look to continue to modernise our activities and respond to customer demand more effectively, it follows that this should be reflected in our charging regime.
- 6.9 Given the primary purpose of the differential in the steam slot charge was to reflect the costs and time involved in gauge clearance activities for 'short' and 'long' journeys, and that with these activities now undertaken externally at the start of each year, there is no longer a need to reflect two different slot charges associated with journey length.
- 6.10 Network Rail therefore proposes a single steam slot charge for 'Trains hauled throughout or in part by Steam Driven Equipment'.

Benefits/rationale

- 6.11 We understand from Network Rail's charter operator Customer Relationship Executive that those charter operators who operate steam locomotives are supportive of a single steam slot charge as it would help to simplify the convoluted billing file produced each period by Network Rail's Track Access Billing team which is, in part, caused by the two steam slot charges. It would simplify the billing process for affected charter operators, without significantly impacting on the costs that they face (see section 'Impact on charter operators').
- 6.12 Charging for charter trains has remained largely free from reform since it's conception. Unlike for passenger operators, the majority of the billing process requires manual interventions. The current steam slot charges require the TABs team to manually review each individual bid, calculate journey lengths and then apply the correct charge. As well as being time consuming, any manual process of this nature is more susceptible to errors.

- 6.13 Analysis of the TABs files (see section 7) shows that the vast majority (87.42 %) of steam journeys are recorded as ‘over 250 Miles’. The effort to disaggregate the ‘short’ steam journeys from the ‘long’ is therefore disproportionate to the differential in the charges applied.
- 6.14 Modernising the slot charge by bringing it in line with diesel / electric hauled charter services will reduce the number of errors contained in the billing files. This will, in turn, improve relationships with customers and de-risk instances of under or over billing.

Methodology for calculating a single steam slot charge

- 6.15 As shown in Table 21, the CP6 slot charge for ‘Steam Under 250 Miles’ and ‘Steam Over 250 Miles’ are £613.1715 and £858.6621 respectively. These are in 2017/18 prices.
- 6.16 Three methods for calculating a single steam slot charge for CP7 have been assessed for suitability. These are:
- Method 1 - assign the midpoint of the two existing charges as the new slot charge for steam hauled services;
 - Method 2 - assign a single steam slot charge on a sliding scale between the two existing charges in line with the proportion of steam journeys which are classified as ‘Over 250 miles’ and attract the higher⁶⁵ charge compared to those which are classified as ‘Under 250 miles’ and attract the lower charge, based on journey count in each category; and
 - Method 3 – similar to Method 2 but the proportionality is based on the cumulative mileage assigned to each category rather than journey count.
- 6.17 In each of these scenarios, journeys categorised as ‘Repeat Steam’ are omitted from the analysis as they attract a singular ‘Repeat Business Slot Charge’ (see Table 22) regardless of the length of the journey or traction type.

Table 22: Repeat Business Slot Charge.

Repeat Business Slot Charge (£, 2017/18 prices)
61.3504

⁶⁵ Slot charges are applied to each individual bid which can contain a number of individual train journeys taking place over a number of days. If the cumulative mileage of a bid exceeds 250 miles, then the bid attracts the higher slot charge.

Results

- 6.18 Method 1 assumes that steam journeys categorised as either Over or Under 250 Miles are evenly split (50 %). The analysis of the Data by journey (Method 2) shows that in fact 87.42 % of all journeys are classified as ‘Over 250 Miles’ as illustrated in Figure 1 of Annex A. Using Method 3, this increases further to 90.68 %.
- 6.19 Table 23 shows what the different single steam slot charge would be in 2017/18, 2019/20 and 2022/23 prices by applying the different methodologies as detailed at para 6.15.

Table 23: Various Steam slot charges - existing and proposed.

Price year	Current Charge		Method 1 - Mid Point	Method 2 - Sliding scale based on Journeys	Method 3 - Sliding scale based on Mileage
	Steam Under 250 Miles	Steam Over 250 Miles	Single Steam Slot Charge	Single Steam Slot Charge	Single Steam Slot Charge
2017/18	£ 613.17	£ 858.66	£ 735.92	£ 827.78	£ 835.81
2019/20	£ 641.38	£ 898.16	£ 769.77	£ 865.86	£ 874.25
2022/23	£ 686.26	£ 961.01	£ 823.63	£ 926.45	£ 935.43

Impact on charter operators

- 6.20 Looking at all the data, i.e. Periods 1- 3 in 2019/20 and Periods 1-3 2022/23 combined, Table 4 shows the potential impact on the four charter operators and Network Rail if we replace the existing steam slot charges for ‘Steam Over 250 Miles’ and ‘Steam Under 250 Miles’ with those calculated for Methods 1-3 as shown in Table 23.

Table 24: Impact on Charter Operators.

Charter Operator	Traction	Existing Slot Charges		Method 1 - Mid-point 50/50		Method 2 - Sliding Scale based on No. of Journeys		Method 3 - Sliding scale based on Mileage		
		£		£	%	£	%	£	%	
DB Cargo (UK) Limited	Under 250	£	3,296.65	£	3,956.58	£	4,329.29	£	4,493.63	
	Over 250	£	7,248.14	£	6,212.02	£	6,926.86	£	7,055.21	
	Total	£	10,544.79	£	10,168.59	-4%	£ 11,256.14	7%	£ 11,548.84	10%
Locomotive Services	Under 250	£	2,082.52	£	2,417.04	£	2,597.57	£	2,745.12	
	Over 250	£	16,983.95	£	14,556.10	£	15,585.43	£	16,531.88	
	Total	£	19,066.47	£	16,973.14	-11%	£ 18,183.00	-5%	£ 19,277.00	1%
Vintage Trains	Under 250	£	6,208.19	£	5,442.25	£	6,061.00	£	6,180.96	
	Over 250	£	5,577.51	£	4,780.21	£	5,195.14	£	5,429.06	
	Total	£	11,785.70	£	10,222.46	-13%	£ 11,256.14	-4%	£ 11,610.01	-1%
West Coast Railway	Under 250	£	5,862.16	£	7,035.65	£	7,792.72	£	7,990.64	
	Over 250	£	34,641.62	£	29,612.64	£	32,036.72	£	33,632.13	
	Total	£	40,503.78	£	36,648.29	-10%	£ 39,829.43	-2%	£ 41,622.77	3%
Total NR Charges		£	81,900.73	£	74,012.49	-10%	£ 80,524.73	-2%	£ 84,058.62	3%

- 6.21 From Table 24, and based on the Data, we can see that the methodology for determining a single steam slot charge which has the least impact on both Network Rail and charter operators is Method 2. In terms of charges levied, cumulatively, charter operators would have been charged 2 % less (£80,524.73) than under the existing charging regime (£81,900.73).

- 6.22 We've already determined that Method 1, being the simplistic approach of finding the mid-point between the existing slot charges, does not accurately reflect the ratio of steam 'Over 250 Miles' compared with steam 'Under 250 Miles'. The inadequacy of Method 1 is further highlighted in Table 24 as using this methodology would return the biggest percentage differential (10%) when compared with the existing charge.
- 6.23 Method 3, while cumulatively for all charter operators, would only represent a 3% difference, crucially, it would see an overall increase in charges. This is especially true for DB Cargo (UK) Limited, who would see their charge rise by c10%, which might not be palatable.

Proposal

- 6.24 It is therefore proposed that for CP7, Method 2 i.e., determining a single steam slot charge based a sliding scale between the existing two steam slot charges in proportion with steam journeys categorised as either 'Steam Under 250 Miles' or 'Steam Over 250 Miles', is the most suitable option. This is because the financial impact (based on the sample Data) for both charters operators and Network Rail will be relatively small and is the least impactful of the 3 methodologies explored.
- 6.25 Network Rail believes that the Data reviewed is representative and captures a portion of the busiest periods for steam charters.
- 6.26 On this basis, the charge at CP7 Year 1 would be set at 87.42% between the two existing slot charges once they had been uplifted by CPI. The single steam slot charge would continue to be subject to indexation for the remainder of the control period.

Annex A – Further detail from the analysis of the data

Figure 5: Steam charter mileage and journey data 1

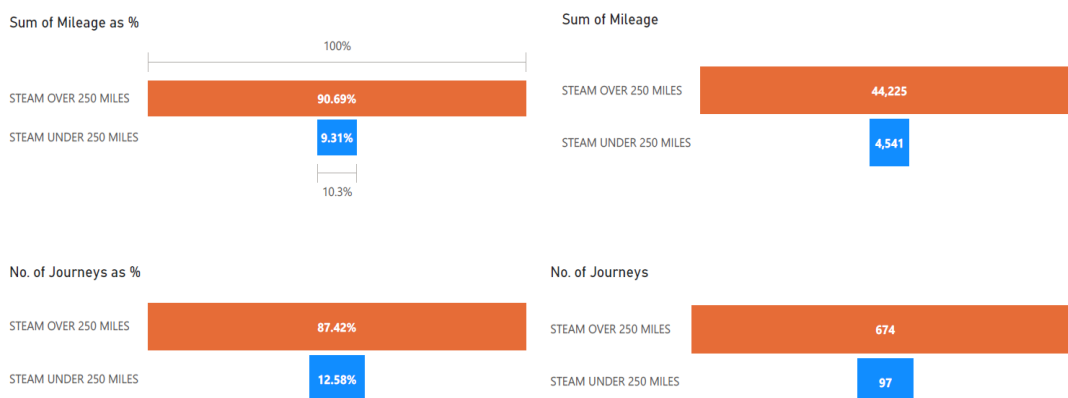


Figure 6: Steam charter mileage data by operator

Charter Company	Traction	%GT Count of Mileage	Mileage
DB Cargo (UK) Limited	STEAM OVER 250 MILES	74.38%	4,771
DB Cargo (UK) Limited	STEAM UNDER 250 MILES	25.62%	603

Charter Company	Traction	%GT Count of Mileage	Mileage
Locomotive Services	STEAM OVER 250 MILES	96.70%	9,867
Locomotive Services	STEAM UNDER 250 MILES	3.30%	502

Charter Company	Traction	%GT Count of Mileage	Mileage
Vintage Trains	STEAM OVER 250 MILES	58.21%	1,769
Vintage Trains	STEAM UNDER 250 MILES	41.79%	798

Charter Company	Traction	%GT Count of Mileage	Mileage
West Coast Railway	STEAM OVER 250 MILES	92.02%	27,818
West Coast Railway	STEAM UNDER 250 MILES	7.98%	2,638

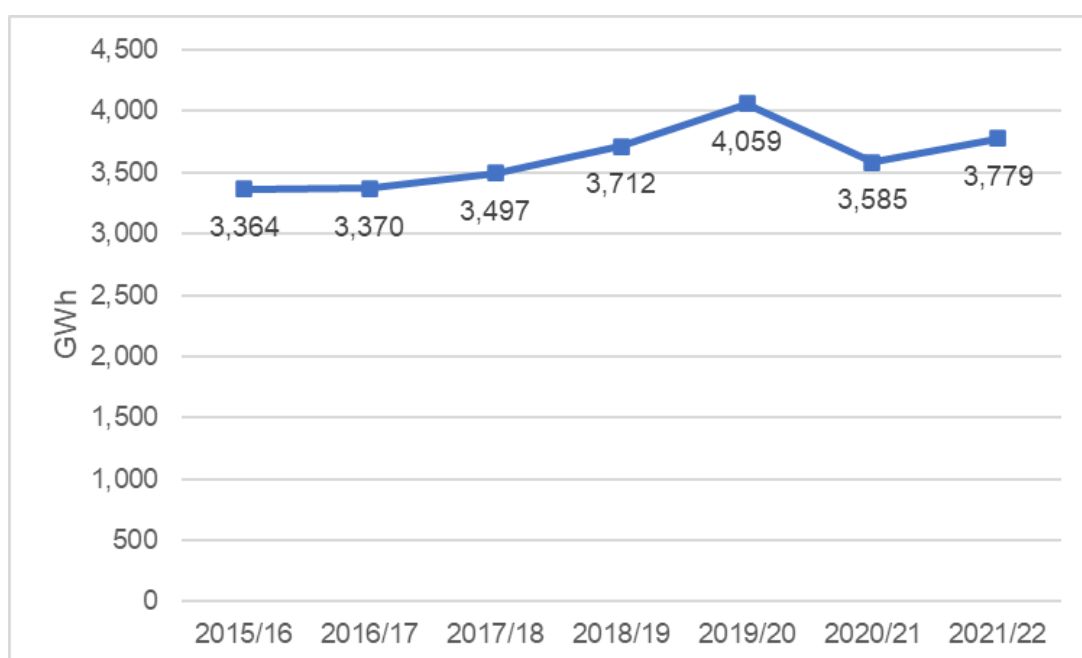
Appendix 7 – Proposed DSLF values and Assumptions

Assumptions on calculations of DSLFs in 2022

General: power consumption

7.1 For all calculations, the net consumption for 2021/22 has been used. This is somewhat lower than the consumption in 2019/20 before the covid pandemic, though slightly higher than in 2018/19. Total traction power consumption for the entire network (AC and DC) over the last few years is as follows.

Figure 7: Traction power consumption by year (AC and DC)



7.2 When DSLFs were last calculated in 2018, the figures used for the AC calculations were from 2016/17 and for DC were 2015/16.

AC supplies

Parameters

7.3 The following parameters are used unchanged from the 2018 report (Estimation Methodology and Assumptions for the CP6 Distribution System Loss Factors, issue 1.1, 29th March 2018):

- a) The average losses across insulators (dependent on whether they are wet or dry, and polymeric or ceramic);
- b) The distance between OLE structures for AC (45m);
- c) The categorisation of systems by load and system type;

- d) The variable loss factors (determined by the system categorisations);
- e) The proportion of the time that insulators are wet (37 %);
- f) The transformer iron losses for booster transformers (150 W) and autotransformers (6500 W).

“Boosterless Classic” systems

7.4 It is assumed that the impedance category of the system is the same as that of a “rail return” system.

Impedance categories – general

- 7.5 For any system type combinations not covered by Table 9 (p26) of the 2018 report, it is assumed:
- a) Single-track or three-track systems are the same as the equivalent two-track;
 - b) Any other combination is Cat II.

Total losses for grid supply points (GSPs) with low net consumption

7.6 Total losses are capped at 50 % of total net consumption. This affects supplies with a low net consumption but relatively high fixed losses – these supplies are typically only used occasionally.

Static frequency converter

- 7.7 Losses for the feeding length are calculated in accordance with the system type as per any other supply, plus an additional factor to account for losses in transforming the incoming grid feed (at 33 kV) to 25 kV and other losses within the SFC. The 2018 report (p28) suggests a figure “in the area of 4 %” for these losses, in the absence of any further information.
- 7.8 On 6th September 2019, efficiency testing was carried out on the then-new SFC at Doncaster Potteric Carr. This resulted in a guaranteed efficiency at 12 MVA of 96.65 % (IEP Doncaster Depot Power SFC, Completion Acceptance Test Programme and Report, ref 3BHS899009 E60 20/09/2019, clause 4.3.4 (p25)). This implies losses of 3.35 %, which is in line with the 2018 estimate and is used for the additional SFC losses.

Dollands Moor (ET) GSP

7.9 This supply is the only AC supply in Southern region (ESTA U), and the amount of power supplied is low (3.06 GWh). In the absence of any information about it, the ESTA is assumed to have the same proportional losses as the average of all other AC supplies (weighted by their net consumption).

Excluded GSPs

- 7.10 Supplies with consumption < 1 GWh are ignored for purposes of DSLF calculation as these supplies are assumed to be rarely used so the calculations are unreliable.
- 7.11 For two other GSPs (Shenfield and North Hyde) it has not been possible to obtain full details of transformers etc within the supplied area. The net consumption figures for these GSPs are low relative to other supplies within the same ESTA, so these supplies are also ignored for purposes of DSLF calculation.

DC supplies

Parameters

- 7.12 The following parameters are used unchanged from the 2018 report:
- a) The total single track kilometre of conductor rail track in Southern Region excluding the Isle of Wight (ESTA U);
 - b) The average insulator spacing (3.6 m);
 - c) The proportion of insulators that are polymeric as opposed to ceramic (50 %);
 - d) The proportion of the time that insulators are wet (37 %);
 - e) The average losses across insulators (dependent on whether they are wet or dry, and polymeric or ceramic);
 - f) The following variable loss percentages which were derived from modelling and the modelling has not been redone:
 - i. HV variable losses (0.97 %),
 - ii. 750 V variable losses in TRUs (2.23 %),
 - iii. 750 V variable losses in ETE (5.09 %).

Isle of Wight, Merseyrail, Watford Electrics, Great Eastern DC

- 7.13 We do not have full details of the transformer ratings etc, so assume the same overall loss percentage as that derived from the main Southern Region ESTA (U).

Distribution System Loss Factors (DSLFS)

- 7.14 The DSLFs have been recalibrated using the same methodology used for CP6 with the updated assumptions as detailed in section 7.1 – 7.13. The technical data has been provided to ORR who will ultimately determine the DSLFs to be applied in CP7.
- 7.15 The proposed CP7 DSLF values (DSLFS 2022), including CP6 values (DSLFS 2018) for reference, are contained in Table 25.

Table 25: Proposed CP7 Distribution System Loss Factors

System	ESTA	Region	Route	Consumption (GWh) 2018 ¹	Consumption (GWh) 2022	Consumption Difference (GWh)	DSLFS 2018 %	DSLFS 2022 %	DLSF Difference
A.C.	A	Eastern	East Coast	96.073	92.468	-3.605	2.94%	2.78%	-0.16%
A.C.	B	Eastern	East Coast	60.105	93.801	33.696	5.19%	3.28%	-1.91%
A.C.	C	Eastern	East Coast	34.363	45.277	10.914	3.93%	3.55%	-0.37%
A.C.	D	Scotland	Scotland	41.152	62.954	21.802	4.41%	4.03%	-0.38%
A.C.	E	Scotland	Scotland	87.593	136.785	49.192	3.02%	4.02%	1.00%
A.C.	F	Scotland	Scotland	58.237	55.008	-3.229	3.44%	3.58%	0.14%
A.C.	G	NW&C	Central	109.682	90.590	-19.092	3.49%	3.88%	0.39%
		North West							
A.C.	H	NW&C	Central	72.265	80.405	8.140	2.91%	2.71%	-0.20%
A.C.	J	NW&C	North West	296.663	233.611	-63.052	3.48%	4.04%	0.55%
A.C.	N	Eastern	East Midlands	131.244	124.490	-6.754	2.72%	2.97%	0.26%
A.C.	O	Eastern	Anglia	85.899	85.196	-0.703	2.57%	2.57%	0.01%
A.C.	P	Eastern	Anglia	293.846	204.397	-89.449	2.64%	2.01%	-0.64%
A.C.	Q	Eastern	Anglia	137.623	128.605	-9.018	4.11%	3.57%	-0.54%
A.C.	R	Eastern	East Coast	185.346	244.116	58.770	2.25%	1.91%	-0.34%
A.C.	S	Scotland	Scotland	84.797	77.135	-7.662	4.07%	4.21%	0.14%
A.C.	T	NW&C	Central	321.640	295.740	-25.900	2.86%	2.81%	-0.05%
A.C.	U	Southern	Kent	0.000	3.058	3.058	-	3.05%	-
A.C.	V	Wales & Western	Wales	221.038	268.949	47.912	1.18%	2.85%	1.67%
		Western							
D.C.	M	NW&C	North West	69.681	62.589	-7.092	10.01%	10.11%	0.10%
D.C.	P	Eastern	Anglia	1.131	1.186	0.055	10.01%	10.11%	0.10%
D.C.	R	Eastern	East Coast	4.093	3.036	-1.057	10.01%	10.11%	0.10%
D.C.	T	NW&C	Central	44.066	38.271	-5.796	10.01%	10.11%	0.10%
D.C.	U	Southern	Kent	1381.875	1310.768	-71.106	10.01%	10.11%	0.10%
		Sussex							
		Wessex							
D.C.	Z	Southern	Wessex	0.812	0.316	-0.496	10.01%	10.11%	0.10%

1 - consumption figures used in 2018 DSLF calculations were 2016/17 figures for A.C. and 2015/16 figures for D.C.

Appendix 8 – Electric Asset Usage Charge Cost Variability Assumptions

- 8.1 Network Rail's expert engineers have advised that for CP7, subject to stakeholder feedback, they are not proposing any changes to the Variability Assumptions used at CP6 for the CP7 recalibration of the Electric Asset Usage Charge (EAUC).
- 8.2 There are two Cost Variability Assumptions present in the EAUC model as follows:
- V1 – which represents the proportion of total cost associated with traffic affected assets; and
 - V2 – of these assets (V1) what proportion of the degradation can be attributed to traffic wear and tear.
- 8.3 These, when combined, generate an overall traffic variability assumption factor for each cost category.
- 8.4 Table 26 contains the variability assumptions, V1 and V2, multiplied to give the overall Cost Variability Assumption used in the EAUC model to calculate the charges for CP6. Network Rail is proposing that these Variability Assumptions are retained for CP7. A report detailing how these cost variability assumptions were calculated is contained in Appendix 4 to [“Annex to Network Rail’s consultation on variable charges and station charges in Control Period 6 \(July 2017\)”](#).

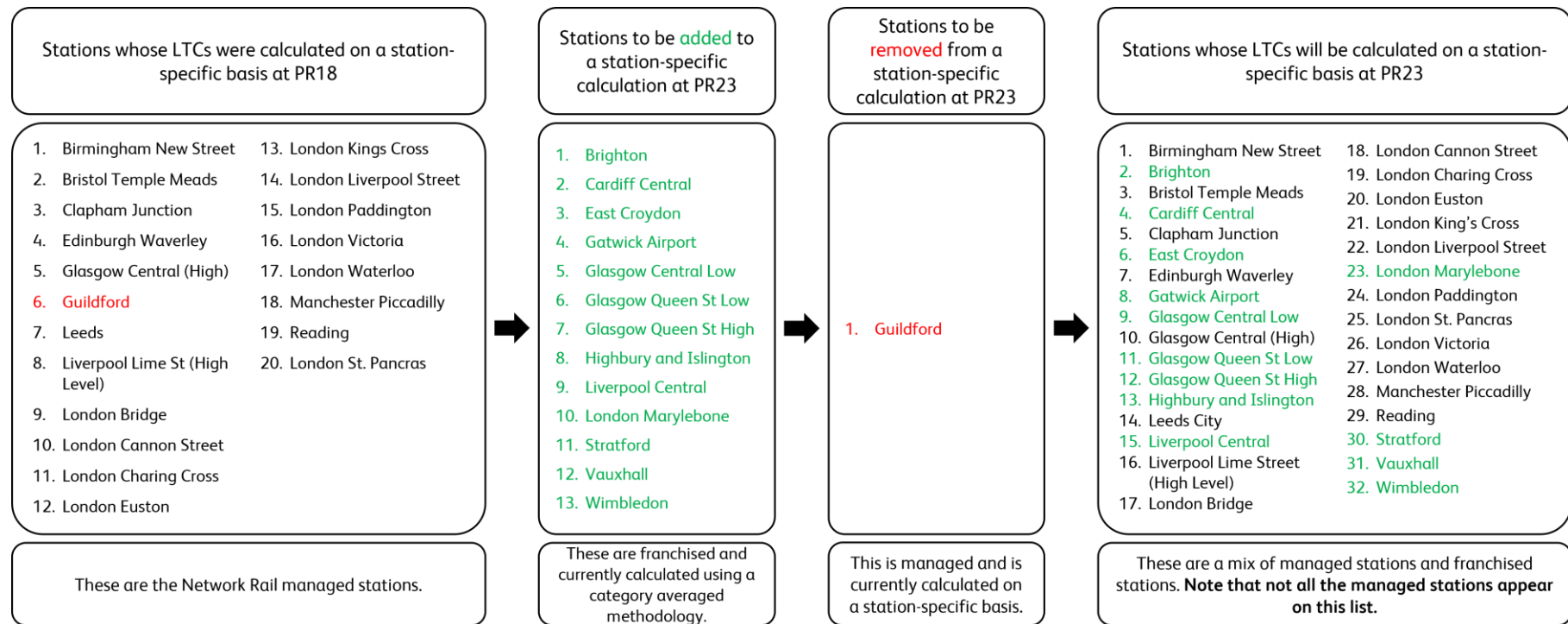
Table 26: EAUC variability assumptions – CP6 Vs CP7.

Category	Traction Type	Sub Category	V1 (%)	V2 (%)	PR18 Variability Assumption (%) (V1xV2)	Proposed CP7 Variability Assumption (%) (V1xV2)
Maintenance	AC	Overhead Line Equipment Maintenance	80%	10%	8%	8%
	DC	ETE Maintenance	40%	52%	20.8%	20.8%
Renewals	AC	Overhead Line Equipment Contact. Catenary Require	80%	90%	72%	72%
	AC	Overhead Line Equipment Mid-Life Refurbishment	60%	70%	42%	42%
	AC	Overhead Line Equipment Full Renewal	15%	70%	10.5%	10.5%
	AC	Overhead Line Equipment Component Change	25%	40%	10%	10.0%
	DC	Conductor Rail Renewal	60%	90%	54.0%	54.0%

Appendix 9 – Station specific LTCs from CP6 to CP7

9.1 Figure 8 shows the change in the list of stations which are under a station specific LTC calculation from CP6 to CP7. It shows which stations have been added to, and removed from, the list of Network Rail managed stations (which had a station specific LTC at PR18) to create the list of large stations (which will have station specific LTCs at PR23).

Figure 8: Change in the list of stations with a station specific LTC from PR18 to PR23.



- 9.2 Figure 9 shows two tables, showing the breakdown of all stations with LTCs⁶⁶ into geographic areas and category average categories (A-F), for both CP6 and CP7. Also shown is the number of managed stations in each CP6 route and the number of large stations in each CP7 region.
- 9.3 Only stations which had an LTC set at the beginning of CP6 are included in these tables to provide a direct comparison; stations which opened over the course of CP6 are not included in these totals. This comparison is to show how the geographic breakdown has changed in within the category average calculation.

⁶⁶ Excluding those under a Full Repairing & Insuring lease.

Figure 9: Left – number of stations in each CP6 route and category. Right – number of stations in each CP7 region and category.

CP6 route	Number of stations in route and CP6 station category (Managed or A-F)		TOTAL	CP7 region	Number of stations in region and CP7 station category (Large or A-F)		TOTAL
Anglia	Managed	1	41	Eastern	Large	6	420
	A	2			A	3	
	B	6			B	20	
	C	11			C	28	
	D	3			D	40	
	E	11			E	101	
	F	7			F	222	
LNW	Managed	4	559	NW&C	Large	6	559
	A	2			A	-	
	B	15			B	15	
	C	25			C	25	
	D	63			D	63	
	E	186			E	186	
	F	264			F	264	
NE & East Mids	Managed	3	379	Scotland	Large	5	358
	A	3			A	-	
	B	14			B	1	
	C	17			C	6	
	D	37			D	25	
	E	90			E	119	
	F	215			F	202	
Scotland	Managed	2	358	Southern	Large	11	560
	A	1			A	5	
	B	1			B	37	
	C	7			C	66	
	D	25			D	107	
	E	120			E	170	
	F	202			F	164	
South Eastern	Managed	4	358	W&W	Large	4	430
	A	6			A	-	
	B	22			B	8	
	C	43			C	15	
	D	73			D	15	
	E	100			E	104	
	F	110			F	284	
Wales	Managed	-	243	TOTAL		2,327	
	A	1					
	B	1					
	C	4					
	D	4					
	E	48					
	F	185					
Western	Managed	3	187				
	A	-					
	B	7					
	C	11					
	D	11					
	E	56					
	F	99					
Wessex	Managed	3	202				
	A	3					
	B	15					
	C	23					
	D	34					
	E	70					
	F	54					
TOTAL			2,327				

Appendix 10 – Category average station categories

- 10.1 All stations not classed as ‘large’ in CP7 will have the operational property element of their LTC calculated under the category averaged methodology; this is the calculation which was applied to franchised stations in CP6.
- 10.2 Under the category average calculation each of the regions is split into six categories, labelled A – F, based on passenger usage (entries into stations/passenger journeys). Category A are the busiest stations and Category F are the least busy stations.
- 10.3 Table 27 defines the category average categories A – F in terms of passenger entries/journeys from a station.

Table 27: Category average calculation categories A - F are based on passenger entries to a station⁶⁷.

Category	Station Type	Daily passenger entries to station (passenger journeys)
A	National Hub	13 000 +
B	Regional Interface	5 000 - 13 000
C	Important Feeder	2 500 - 5 000
D	Medium Staffed	1 200 - 2 500
E	Small Staffed	300 - 1 200
F	Small Unstaffed	0 - 300

- 10.4 Each of the region’s total operational property forecast, for all stations not classed as large, is allocated out to each station in the region based on the six passenger-based categories.
- 10.5 All of the stations in a given region and category will have the same operational property charge.
- 10.6 For the avoidance of doubt, a category B station (for example) in one region will not have the same operational property charge as a category B station in another region, because:
- Each region will have an independent and different total forecast operational property expenditure forecast; and
 - Each region will have a different number of category B stations.

⁶⁷ Estimates of the number of entries per annum for each station are used to generate daily entries figures, which are taken from ORR’s estimate of station usage, available [here](#) – as stated in [Network Rail’s PR18 Final Determination consistent price lists: key assumptions](#), 03/12/2018.