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OFFICE OF RAIL REGULATION

16 July 2013

Addressee list in the annex

Dear stakeholder,

Technical decision on passenger Schedule 8 payment rates in Control Period 5 (CP5)

1. As you will be aware, as part of our 2013 Periodic Review (PR13), we are reviewing the Schedule 8 performance regime¹ to ensure that it acts as an effective compensation and incentive mechanism in CP5. This includes work which we and Network Rail have jointly commissioned from Halcrow to update Schedule 8 benchmarks and payment rates. So far Halcrow has calculated draft Schedule 8 payment rates based on the draft PDFH 5.1 as of 22 March 2013. The relevant evidence in PDFH 5.1 has since been finalised.

2. On 15 May 2013, Network Rail consulted on an alternative proposal to the methodology used by Halcrow for updating Schedule 8 Network Rail payment rates in relation to commuter flows to and from London². **The purpose of this letter is to advise you of our technical decision in relation to Network Rail's consultation.**

3. In our draft determination we proposed to either retain the CP4 capacity charge rates or implement a version of a proposal put to us by the Rail Freight Operators' Association³. Concerns have been raised regarding the impact of our proposal to continue with the CP4 capacity charge rates, while at the same time updating the Schedule 8 payment rates. It is important to ensure that during CP5, Network Rail continues to have the right incentives to allow additional traffic on the network. **We will therefore make a final decision on Schedule 8 payment rates together with our final decision on the capacity charge and volume incentive, in our final determination.**

4. As a result, there is a possibility that the final set of Schedule 8 payment rates, calculated by Halcrow and validated by train operators, may subsequently be adjusted as part of our final determination.

¹ Schedule 8 for passenger operators is to provide compensation for the impact of lateness due to Network Rail and third party train operators. It also provides an incentive on Network Rail and train operators to minimise disruption to other operators. More information on the Schedule 8 performance regime and its purpose is contained in our draft determination, paragraphs 20.1 to 20.18. See <http://www.rail-reg.gov.uk/pr13/consultations/draft-determination.php>.

² See <http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064785996>.

³ See paragraphs 16.118 – 16.126 of our draft determination.



Network Rail's consultation on Schedule 8 payment rates for London commuter flows

5. Network Rail raised concerns that the methodology for calculating Schedule 8 Network Rail payment rates in respect of commuter flows⁴ to and from London would result in payment rates that are too high. These concerns were raised in the context of large increases in the draft CP5 Schedule 8 payment rates relating to these services, which are in part a result of revised estimates from the recent update to the Passenger Demand Forecasting Handbook (PDFH 5.1), on the extent passenger demand responds to journey time. Network Rail proposed an alternative approach which we asked it to consult on.

6. We have considered Network Rail's consultation and the responses it received carefully. In this letter we make a technical decision on how Schedule 8 payment rates should be calculated for CP5, **when Schedule 8 payment rates are considered in isolation**. This methodology will inform the final set of Schedule 8 payment rates to be calculated by Halcrow and validated with train operators.

7. In its consultation, Network Rail highlighted two reasons why it is concerned that, for London commuting flows, applying the established methodology and approach for calculating the Schedule 8 payment rates, using the GJT elasticities⁵ and late time multipliers⁶ from PDFH 5.1, results in payment rates that significantly overstate the sensitivity of passenger demand to variations in performance.

8. The first reason relates to the evidence base for the PDFH 5.1 update, which includes six studies that attempted to directly measure the effect of train performance on demand. Three of these studies attempted to do so for London commuting. Of these, Network Rail argued that two of the studies were unable to find a statistically significant effect⁷; while the third study found the impact of performance on demand to be almost negligible⁸.

9. The second reason relates to a high level 'back-casting' analysis⁹ by Network Rail on London commuting as a whole during the period immediately after the Hatfield rail accident (2000/2001), when performance declined significantly, and then subsequently improved in the years that followed. The purpose of the analysis Network Rail conducted was to estimate the extent that these changes in train performance led to changes in passenger demand as would be predicted by

⁴ A flow refers to passenger journeys between two stations. Network Rail advised that the flows it referred to as commuter flows are those journeys which are made using season tickets.

⁵ How passenger demand is affected by percentage changes in journey time.

⁶ How passengers value lateness compared to scheduled journey time.

⁷ MVA (2008), 'Econometric Analysis of Long Time Series Rail Passenger Demand Aggregates', prepared for Department for Transport; and ARUP/OXERA (2010), 'What are the Findings from the Econometric Analysis? Findings Report', prepared for the Department for Transport, Transport Scotland and Passenger Demand Forecasting Council (PDFC).

⁸ Steer Davies Gleave (2003), 'The Effect of Road Congestion on Rail Demand', report to PDFC.

⁹ This is analysis looking at the actual results for a period of time and then comparing them to what would have been forecasted using particular forecasting methods.

the methodology used to update Schedule 8 payment rates. It covers the period from 1999/2000 to 2010/2011 and takes into account changes to central London employment and fares.

10. Network Rail stated that these two pieces of evidence suggest the impact of performance on revenue is much less than would be implied through use of the PDFH evidence on GJT elasticities and late time multipliers. It also put forward the following theoretical reasons to explain these gaps:

- (a) re-distribution effects;
- (b) crowding; and
- (c) time-lags.

Re-distribution effects

11. For commuter services within the London travel card area and between London and the South East (but not those services from the rest of the country to and from London), PDFH 5.1 states that it should be assumed that 30% of the forecast growth in peak traffic associated with improvements in GJT is abstracted from other rail services in the South East (not necessarily from adjacent routes).

12. Following the Hatfield incident, it is unlikely such redistribution would have occurred since performance deteriorated and recovered on almost all routes into London at the same time¹⁰. Network Rail did not factor this into its analysis and acknowledged in its consultation that this would therefore explain a proportion of the gap.

13. Network Rail suggested that Schedule 8 payment rates should not be adjusted to take into account this element of the gap, since Schedule 8 payment rates should reflect the impact of performance on a train operator's revenue, even if some of it is in fact a re-distribution from other operators.

Crowding

14. Network Rail stated that under the PDFH framework, GJT elasticities do not take into account the effect of crowding on demand, and that on crowded services the responsiveness of demand to changes in performance will be reduced.

Time lags

15. Network Rail said that in much of the London commuting market, 'there is little or no effective alternative to rail travel in the short-term as significant changes in demand can only take place as a result of commuters moving their place of residence or place of work'. It thinks that while Schedule

¹⁰ So there would have been fewer opportunities for passengers to switch to more reliable services.

8 payment rates should reflect the long-run effects on demand, at least some reduction to reflect discounting of future cash flows would be appropriate.

Network Rail's proposal

16. Network Rail said that it is clear that, for London commuting flows, Schedule 8 payment rates based solely on PDFH 5.1 lateness multipliers and GJT elasticities would overstate the actual impact of performance on revenue, and that therefore an adjustment is needed. Network Rail's proposal involved using the same GJT elasticities that were used for these flows¹¹ when Schedule 8 was updated in 2005. This is shown in Table 1.

Table 1 – Network Rail's proposed adjustment to GJT elasticities

	PDFH 5.1		Network Rail proposal	
	GJT elasticity	Late time multiplier	GJT elasticity	Late time multiplier
Within Greater London	-0.90	2.50	-0.80	2.50
South East to/ from London	-1.25	2.50	-0.80 / -0.60 ¹²	2.50
Rest of country to/ from London	-1.35	2.50	-0.60	2.50

17. Network Rail's proposal reflects its view that using the PDFH 5.1 parameters would result in Schedule 8 payment rates that are too high by a significant margin, and that there is no evidence to suggest the CP4 Schedule 8 payment rates are currently too low.

Consultation responses and Network Rail conclusion

18. Responses to Network Rail's consultation made different points. The Department for Transport (DfT) and Transport Scotland expressed the view that we should not use any of the PDFH 5.1 GJT elasticities and late time multipliers until they have been peer reviewed independently to see if they are suitable for incorporation into the DfT's transport appraisal guidance (WebTAG). The DfT acknowledged that this review would not be complete in time for CP5 but argued that we should therefore use GJT elasticities and late time multipliers from the previous PDFH.

19. Responses from the majority of train operators and Transport for London argued strongly that we should base the Schedule 8 payment rates on the most up to date evidence from PDFH, and

¹¹ Network Rail proposed only applying this adjustment for season tickets relating to the London travel card area and commutes from outside the London travel card area to London. Flows in the opposite direction do not share the same characteristics.

¹² A figure of -0.8 was used in 2004-05 for 'London inners' (i.e. services operating within the M25, in general) and a figure of -0.6 for 'London outers' (i.e. services operating from further outside London to the 'inner' zone).

rejected Network Rail's proposal on various grounds, including on the basis that the performance shock after Hatfield is not typical of the much smaller changes in performance Schedule 8 is designed to compensate for and that it only took into account central London employment and fares. Responses also highlighted instances where capacity is being increased during CP5, which would reduce the impact of crowding. A small number of train operators expressed concern about the extent to which the draft CP5 Schedule 8 payment rates are higher than the CP4 Schedule 8 payment rates, with one operator suggesting that a more thorough review of the structure of Schedule 8 should be made before CP6, and that for CP5, the changes we make to Schedule 8 payment rates should be minimal.

20. Network Rail's consultation and conclusion is published at <http://www.networkrail.co.uk/publications/delivery-plans/control-period-5/periodic-review-2013/pr13-closed-consultations/>. Network Rail will also shortly be publishing non-confidential consultation responses on its website.

Our view

21. Since Schedule 8 payment rates form the basis of bonus and compensation payments when Network Rail and train operators are performing better or worse than their respective benchmarks, it is important that they are set at an appropriate level for CP5.

22. After carefully reviewing the evidence and consultation responses, our opinion is that some of the issues Network Rail raised in its consultation letter do suggest that basing Schedule 8 payment rates relating to London commuting flows solely on PDFH 5.1 GJT elasticities and late time multipliers, would result in Schedule 8 payment rates that overstate the impact of performance on revenue. Below we outline in more detail our judgement on the issues raised by Network Rail and in consultation responses.

Whether to use PDFH 5.1 GJT elasticities when calculating CP5 Schedule 8 payment rates for all services¹³

23. We do not agree with the suggestion made by DfT and Transport Scotland that we should use GJT elasticities and late time multipliers from an earlier edition of PDFH. Our view is that the GJT elasticities and late time multipliers in the PDFH 5.1 are more robust than those which appear in previous editions of the PDFH.

24. The reasons we regard the GJT elasticities in PDFH 5.1 as more robust are:

- (a) they are based on the most comprehensive review of GJT elasticities ever undertaken, which has involved an analysis of more studies than before, some of which are too recent to have been included in the analysis for previous editions of the PDFH;

¹³ An exception to this could be instances where we approve joint proposals from Network Rail and train operators for alternative Schedule 8 payment rates.

- (b) a recent Institute of Transport Studies and Mott MacDonald study¹⁴ on the impact of large changes in GJT found that the GJT elasticities from PDFH 5.0 frequently understated the demand effects; and
- (c) the GJT elasticities in the PDFH 5.1 are clear on what time period they relate to. It is not clear that the time period the GJT elasticities in earlier versions of the PDFH were meant to relate to, which reduces the accuracy in which they can be applied.

25. We are not of the opinion that the updated late time multipliers are as robust as the updated GJT elasticities. For example, they are based on stated preference research rather than observed impacts on demand, and it does not appear that the researchers' approach to deciding which studies and observations should be included was as thorough as it was with the GJT elasticity analysis. However, we do regard the late time multipliers in PDFH 5.1 as a significant improvement on those in previous editions of the PDFH. This is because:

- (a) they are based on a meta-analysis incorporating several studies, including those which are too recent for inclusion in earlier editions of the PDFH. The late time multipliers used in the 2005 update of Schedule 8 and included in subsequent editions of the PDFH are mainly based on a single stated preference study, Bates et al. (2000)¹⁵, particularly the breakdown between different ticket categories; and
- (b) late time multipliers were adjusted downwards to make them consistent with the results of an analysis of evidence which observes the direct impact of performance on demand. While PDFH 5.1 states that 'given the greater amount of evidence on late time multipliers and the slightly greater amount of detail emerging from the review, it was decided to maintain the current PDFH approach to forecasting the demand effects of the reliability of using late time multipliers and a GJT elasticity', our view is that these adjustments have helped ensure that the final set of late time multipliers are not higher than they should be.

Evidence on direct impact of performance on passenger demand for London commuter services

26. The research evidence that Network Rail referred to in its consultation letter (see paragraph 8) is specifically on the direct impact of reliability on demand for London commuter services. We note that in addition to this, Arup/ Oxera (2010) did find a statistically significant effect for some season ticket journeys from outside London and the South East, to London and the South East. Overall results of the meta-analysis using this data, conducted as part of the update of PDFH 5.1, and taking into account studies with results for all types of flow, did not suggest such a low direct impact of performance on demand.

¹⁴ Institute of Transport Studies and Mott MacDonald (2012), 'The impact of large changes in Generalised Journey Time on rail passenger demand', prepared for Passenger Demand Forecasting Council.

¹⁵ Bates, Jones, Polak and Cook (2000), 'The investigation of punctuality and reliability'.

27. It is concerning that Network Rail's high level back-casting exercise suggests such a large inconsistency between the estimated impact of demand on performance through applying the PDFH framework and the actual impact of demand on performance. However, the following also needs taking into account:

- (a) Schedule 8 payment rates are intended to compensate train operators for relatively small changes in performance. The performance that followed the Hatfield incident was atypical in the sense that it affected most services and on many routes caused delays to more than double. In the PDFH it is emphasised that the GJT elasticities and late time multipliers would not necessarily be able to provide robust forecasts for either the impact of this, or the recovery from it. Also, if passengers regarded Hatfield as an exceptional incident with an impact on performance that is temporary, it may have lessened their expectations of its impact on long term performance and therefore the impact on demand.
- (b) In addition to this, ATOC and train operators have raised the following concerns with Network Rail's analysis, which taken together with the above, limit the weight we have placed on this specific piece of analysis by Network Rail when reaching our conclusion:
 - (i) it has been developed by a party which is not independent and potentially stands to gain financially from it;
 - (ii) it does not control for factors other than fares and central London employment; and
 - (iii) the back-cast does not explicitly exclude lags.

28. Nevertheless, we think it likely that some of the reasons Network Rail give to explain the gap are plausible, particularly given the extent of the possible gap suggested by the back-casting exercise and the results from some of the academic studies on the direct impact of performance on passenger demand for London commuter services.

Re-distribution effects

29. We agree with Network Rail that the existence of re-distribution effects, where poor performance on one service causes passengers to travel on a different service, is in general not a reason to adjust Schedule 8 payment rates downwards.

30. However, there may be instances where poor performance from Network Rail on one of a train operator's service groups results in passenger demand moving from that service group to another service group run by the same train operator. This means that there is a possibility that for some service groups, Schedule 8 payment rates are higher than they should be, but we do not know the extent of this, or whether or not it is material.

Crowding

31. PDFH 5.1 states that it has 'sought to separate out the impacts of crowding from other factors; but inevitably a reduction in journey time or fares might lead to an increase in demand, a part of

which is crowded off; there is a danger this might be registered as a lower GJT or fares elasticity rather than two separate effects’.

32. The GJT elasticities in PDFH 5.1 are based on a number of studies, including studies looking at the impact of particular schemes, e.g. electrification schemes, and those using large amounts of GJT data from several years. The most measurable changes in GJT may well coincide with timetable recasts, when rolling stock capacity may well also change, which would suggest the GJT elasticities are perhaps based on services with relatively unconstrained capacity. However, the extent of this is not clear.

33. In practice, the fact that commuter services in London and the South East tend to be more capacity constrained than elsewhere, could already have been to some degree, unintentionally included within the GJT elasticity estimates in the PDFH, which are indeed lower for London commuter flows than elsewhere. Also, as Network Rail acknowledges, in the longer run, capacity is being increased on certain parts of the network.

34. In conclusion, our opinion is there may be some validity in Network Rail’s concerns regarding the existence of capacity constraints. But we are mindful that in practice some of the capacity constraints may have already been included within the lower GJT elasticities for London and South East flows compared to the rest of the country, even though this was not the intention.

Time lags

35. Our view is that the existence of longer time lags for commuter services in relation to changes in reliability and punctuality affecting revenue, is the strongest reason against using the PDFH 5.1 GJT elasticities and late time multipliers without any adjustment.

36. Table 2 shows the recommended time lags contained in PDFH 5.1.

Table 2 – Recommended values for time lags in PDFH 5.1

	End Q1	End Q2	End Q3	End Year 1	End Year 2	End Year 3	End of Year 4	End of Year 5
Deteriorations in reliability or punctuality (non-commuting)	60%	75%	80%	85%	100%	100%	100%	100%
Improvements in reliability or punctuality (non-commuting)	55%	70%	75%	80%	95%	100%	100%	100%
Changes in all factors (commuting)	45%	60%	65%	70%	80%	90%	95%	100%

37. If this framework were followed, for non-commuting flows, the effect of discounting future cash flows on Schedule 8 payment rates would be small since 85% of the impact of performance is felt by the end of Year 1. The cost of capital for each train operator is not publicly available. However, as an illustrative example, if we applied a discount rate of between 5% and 10%, for each year that the revenue impact occurs in the future, Schedule 8 payment rates would reduce by between 1.0% and 2.0%.

38. For commuter flows, the recommended time lag is longer than in the previous editions of the PDFH. PDFH 5.1 recommends assuming that 70% of the impact is felt by the end of Year 1; 90% by the end of year 3; with the full impact being felt by the end of Year 5. If we were to apply a discount rate to future cash-flows to commuter services, the effect on Schedule 8 payment rates would be more significant. As an illustrative example, if we applied a discount rate of between 5% and 10%, for each year the revenue impact occurs in the future, Schedule 8 payment rates would reduce by between 3.1% and 6.0%.

39. Also, given the extent franchises will be renewed during CP5, in many cases the longer term impacts of performance on revenue will not be relevant to the train operator receiving compensation or paying a bonus. Table 3 shows the proportion of train operators during CP5 whose franchises will end within a certain time period and the average time left in franchise agreements.

Table 3 – Length of time left in franchises during CP5

	Average for each year of CP5
% TOCs with fewer than 2 years left of franchise	33%
% TOCs with fewer than 3 years left of franchise	40% – 43%
% TOCs with fewer than 4 years left of franchise	45% – 51%
Average number of years left of franchise	3.9 – 5.3 years

Note: the figures in this table are based on the franchising timetable recently published by the Department for Transport at <https://www.gov.uk/government/publications/rail-franchise-schedule> and expected franchise renewal dates for train operators with other franchising authorities. Franchise extensions that are not included within the original franchise agreements are treated in this analysis as separate franchises. The calculations have been made on the assumption that the new franchise agreements will be 7-10 years long. For each year of CP5, we have calculated the time left in each franchise in relation to October of the given year, which is the mid-point of the year.

40. Even if a discount rate were applied to Schedule 8 payment rates to reflect train operators' average cost of capital, the fact that franchises are finite in length means that for some train operators, the compensation they receive for worse than benchmark performance or bonuses they pay for better than benchmark performance, would be too high. Table 3 shows that this would be the case for a significant proportion of franchised train operators during CP5. This is clearly much less of an issue in relation to non-commuting flows which have much shorter time lags.

Our decision

41. We agree with Network Rail that due to the degree of uncertainty involved and complexity of modelling, it would not be possible to model the impact of the issues Network Rail has raised, using the full PDFH framework in time for the beginning of CP5.

42. However, we are also of the opinion that it would not be appropriate to revert to an earlier set of GJT elasticities, for example those used in the previous update of Schedule 8 payment rates, as Network Rail suggests. We are not convinced that doing this would result in Schedule 8 payment rates that better reflect the impact of performance on revenue. This is for two reasons:

- (a) we are not persuaded that the issues Network Rail raises merit an adjustment downwards as large as the one Network Rail is proposing; and
- (b) the distribution of GJT elasticities between flow types in PDFH 5.1 is different from previous editions of the PDFH, with GJT elasticities for longer journeys to and from London being higher relative to those of shorter journeys.

43. We also consider that, while it is difficult to estimate the impact of the factors Network Rail has identified, we should take them into account. Otherwise, Schedule 8 payment rates would typically overstate the impact of performance on a train operator's revenue. They would also be inconsistent with the PDFH framework, which implies that the impact of performance on demand takes place over time and can be dampened when services are crowded.

44. If overstated, Schedule 8 payment rates would over-compensate train operators when performance is worse than benchmark. However, in instances where Network Rail performs better than benchmark, train operators would be subject to Schedule 8 payments which typically exceed the revenue the train operators would subsequently receive.

45. We therefore see an application of the GJT elasticities and late time multipliers in PDFH 5.1 without an adjustment, as something that would increase the risk faced by train operators in relation to Network Rail's performance, and therefore reduce the effectiveness of Schedule 8 as a compensation mechanism for train operators. It would also result in incorrectly aligned incentives, which may result in sub-optimal investment decisions by Network Rail.

46. Our technical decision is therefore that, as a default we will apply GJT elasticities and late time multipliers from PDFH 5.1 for all service groups, but adjust the PDFH 5.1 GJT elasticities for commuter flows to London downwards by 10%¹⁶. This adjustment will minimise the risk that Schedule 8 payment rates for London commuter flows are set at a level that is too high or too low on average.

¹⁶ Consistent with Network Rail's proposal, we will only apply this adjustment for season tickets relating to the London travel card area and commutes from outside the London travel card area to London, on the basis that flows in the opposite direction do not share the same characteristics. We will apply the adjustment to the GJT elasticities so it can be compared easily with Network Rail's proposal, but it could equally have been applied to the late time multipliers.

47. Given the uncertainties around the evidence, our decision on the size of the adjustment is necessarily based to a large extent on judgement, but it also reflects the following characteristics of London commuting flows¹⁷:

- (a) PDFH 5.1 recommends a greater time lag for commuter services. While this recommendation does not just relate to commuter flows to and from London, for London commuter flows there are fewer alternatives to the train than elsewhere¹⁸. The greater time lag means:
 - (i) not discounting Schedule 8 payment rates for the cost of capital has more of an impact on the payment rate than for other services; and
 - (ii) there is a higher chance of train operators not being affected by the full impact of performance on revenue, due to franchise change. For commuter flows, even after 3 years, 10% of the impact of poor performance on revenue will not have been felt,
- (b) peak services in London and South East are typically more crowded than elsewhere; and
- (c) for commuting flows to and from London, there is likely to be a greater degree of substitution between services (rather than transport modes) as a result of performance. In some instances this substitution will be between services groups run by the same train operator.

48. Our technical decision is consistent with the framework and evidence in PDFH 5.1, since PDFH 5.1 explicitly recommends taking into account the time it takes for improvements or deteriorations in performance to affect revenue for commuter services, and refers to the fact that crowding could dampen the impact of journey time reductions. These elements are reflected in our 10% adjustment to the GJT elasticities for commuter flows to and from London.

Next steps

49. Halcrow will now calculate a set of payment rates based on our technical decision made in this letter. The 10% downward adjustment to GJT elasticities will be made at flow level. Halcrow will then validate the calculations with train operators and Network Rail.

50. The tables in Annex A show the GJT elasticities and late time multipliers that will be applied to Halcrow's final calculation of payment rates, and also those that would have been applied if we were to have used the PDFH 5.1 GJT elasticities and late time multipliers without an adjustment, or according to Network Rail's consultation proposal.

¹⁷ These are listed in order of importance.

¹⁸ This is in line with recommendations in the PDFH for higher cross elasticities for non-London season ticket journeys, suggesting that there is more opportunity for commuters to switch between rail and other transport modes in other parts of the country.

51. As mentioned above, this letter outlines our **technical decision on the standard approach for calculating Schedule 8 payment rates when considered in isolation. We will make our final decision on Schedule 8 payment rates together with our final decision on the capacity charge and volume incentive, in our final determination**, and therefore may need to subsequently adjust the final set of Schedule 8 payment rates produced by Halcrow. These will be circulated at around the time of our final determination.

Alternative Schedule 8 Network Rail payment rates

52. This letter relates to the default approach for calculating the Schedule 8 Network Rail payment rates. As we explained in our letter on 14 May 2013, there may be certain local circumstances where both Network Rail and a train operator are of the view that an alternative Schedule 8 payment rate would better reflect the impact of performance on revenue over time, for a particular service group. In these circumstances Network Rail and the train operator may jointly propose an alternative Schedule 8 payment rate for our approval. To be incorporated into our PR13 update of Schedule 8 payment rates, we require these proposals to be submitted to us by close of play 22 July 2013. This is an extension to the original deadline of 17 July 2013 and is a result of us sending this letter four working days later than originally planned.

53. The final Schedule 8 Network Rail payment rates will be included in the calculations of the final Schedule 8 train operator payment rates, to ensure that Schedule 8 remains financially neutral when all parties are performing in line with expectations.

54. If you have any queries about this letter, please e-mail Robert.mills@orr.gsi.gov.uk.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Carl Hetherington', written in a cursive style.

Carl Hetherington

Addressee list:

Abellio, Arriva Trains Wales, ATOC, Chiltern railways, Cross Country Trains, , DfT, East Coast, Stagecoach East Midlands Trains, First Capital Connect, First Scot Rail, First Hull Trains, First Greater Western, First Transpennine Express, First Group, Go ahead, Grand Central, Greater Anglia, London Midland, LOROL, Mersey Rail, National Express, Network Rail, Northern Rail, South Eastern, Stagecoach South Western Trains, Southeastern Railway, Southern Railway, Stagecoach, Transport Scotland, Virgin Trains

Annex A – Tables showing GJT elasticities and late time multipliers

1. The tables in this annex show GJT elasticities and late time multipliers that:

- (a) will be applied by Halcrow to each flow type on the basis of our decision in this letter;
- (b) would have been applied by Halcrow if we were to have used the PDFH 5.1 GJT elasticities and late time multipliers, but without any adjustment to London commuting flows; and
- (c) would have been applied by Halcrow if we were to have accepted the proposal Network Rail set out in its consultation letter.



Table A1 – ORR decision on late time multipliers and GJT elasticities

Late time multipliers

All flows PDFH 5.1

Flow type	Suburban (less than 20 miles)		Inter-urban (>20 miles)	
	Commuting	Non-commuting	Commuting	Non-commuting
London TCA	2.5	2.3	2.5	2.3
London to South East	2.5	2.3	2.5	2.3
South East to London	2.5	2.3	2.5	2.3
South East to South East	3.0	2.3	3.9	3.4
London to Outside LSE	2.5	3.0	2.5	3.0
Outside LSE to London	2.5	3.0	2.5	3.0
Outside LSE to South East	3.0	2.3	3.9	3.4
South East to Outside LSE	3.0	2.3	3.9	3.4
Outside LSE to Outside LSE	3.0	2.3	3.9	3.4
Airports	6.0	6.0	6.0	6.0

GJT elasticities

London commuting flows PDFH 5.1 but with a 10% reduction

Other flows PDFH 5.1

Flow Type	Suburban (less than 20 miles)			Inter-urban (>20 miles)		
	Full	Reduced Ticket	Season Ticket	Full	Reduced Ticket	Season Ticket
London TCA	-0.9	-0.9	-0.81	-0.9	-0.9	-0.81
London to South East	-1.25	-1.25	-1.25	-1.25	-1.25	-1.25
South East to London	-1.25	-1.25	-1.125	-1.25	-1.25	-1.125
South East to South East	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2
London to Outside LSE	-1.35	-1.35	-1.35	-1.35	-1.35	-1.35
Outside LSE to London	-1.35	-1.35	-1.215	-1.35	-1.35	-1.215
Outside LSE to South East	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2
South East to Outside LSE	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2
Outside LSE to Outside LSE	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2
Airports*	-1.25	-1.25	-1.25	-1.25	-1.25	-1.25

* Airport elasticities are assumed to be the arithmetic average between the airport inbound elasticity and airport outbound elasticity due to the lack of detailed information on airport flows in Lennon.



Table A2 – PDFH 5.1 GJT elasticities and late time multipliers

Late time multipliers

Flow type	Suburban (less than 20 miles)		Inter-urban (>20 miles)	
	Commuting	Non-commuting	Commuting	Non-commuting
London TCA	2.5	2.3	2.5	2.3
London to South East	2.5	2.3	2.5	2.3
South East to London	2.5	2.3	2.5	2.3
South East to South East	3.0	2.3	3.9	3.4
London to Outside LSE	2.5	3.0	2.5	3.0
Outside LSE to London	2.5	3.0	2.5	3.0
Outside LSE to South East	3.0	2.3	3.9	3.4
South East to Outside LSE	3.0	2.3	3.9	3.4
Outside LSE to Outside LSE	3.0	2.3	3.9	3.4
Airports	6.0	6.0	6.0	6.0

GJT elasticities

Flow Type	Suburban (less than 20 miles)			Inter-urban (>20 miles)		
	Full	Reduced Ticket	Season Ticket	Full	Reduced Ticket	Season Ticket
London TCA	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9
London to South East	-1.25	-1.25	-1.25	-1.25	-1.25	-1.25
South East to London	-1.25	-1.25	-1.25	-1.25	-1.25	-1.25
South East to South East	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2
London to Outside LSE	-1.35	-1.35	-1.35	-1.35	-1.35	-1.35
Outside LSE to London	-1.35	-1.35	-1.35	-1.35	-1.35	-1.35
Outside LSE to South East	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2
South East to Outside LSE	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2
Outside LSE to Outside LSE	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2
Airports*	-1.25	-1.25	-1.25	-1.25	-1.25	-1.25

* Airport elasticities are assumed to be the arithmetic average between the airport inbound elasticity and airport outbound elasticity due to the lack of detailed information on airport flows in Lennon.



Table A3 – Network Rail proposed GJT elasticities and late time multipliers

Late time multipliers

London Commuting Flows: <http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064785996>

Other flows: PDFH 5.1

Flow type	Suburban (less than 20 miles)		Inter-urban (>20 miles)	
	Commuting	Non-commuting	Commuting	Non-commuting
London TCA	2.5	2.3	2.5	2.3
London to South East	2.5	2.3	2.5	2.3
South East to London	2.5	2.3	2.5	2.3
South East to South East	3.0	2.3	3.9	3.4
London to Outside LSE	2.5	3.0	2.5	3.0
Outside LSE to London	2.5	3.0	2.5	3.0
Outside LSE to South East	3.0	2.3	3.9	3.4
South East to Outside LSE	3.0	2.3	3.9	3.4
Outside LSE to Outside LSE	3.0	2.3	3.9	3.4
Airports	6.0	6.0	6.0	6.0

GJT elasticities

London Commuting Flows: <http://www.networkrail.co.uk/WorkArea/DownloadAsset.aspx?id=30064785996>

Others: PDFH 5.1

Flow Type	Suburban (less than 20 miles)			Inter-urban (>20 miles)		
	Full	Reduced Ticket	Season Ticket	Full	Reduced Ticket	Season Ticket
London TCA	-0.9	-0.9	-0.8	-0.9	-0.9	-0.8
London to South East	-1.25	-1.25	-1.25	-1.25	-1.25	-1.25
South East to London	-1.25	-1.25	-0.8	-1.25	-1.25	-0.6
South East to South East	-1.1	-1.1	-1.1	-1.1	-1.1	-1.2
London to Outside LSE	-1.35	-1.35	-1.35	-1.35	-1.35	-1.35
Outside LSE to London	-1.35	-1.35	-0.6	-1.35	-1.35	-0.6
Outside LSE to South East	-1.1	-1.1	-1.1	-1.1	-1.1	-1.2
South East to Outside LSE	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2
Outside LSE to Outside LSE	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2
Airports*	-1.25	-1.25	-1.25	-1.25	-1.25	-1.25

* Airport elasticities are assumed to be the arithmetic average between the airport inbound elasticity and airport outbound elasticity due to the lack of detailed information on airport flows in Lendon.

