Chris Hemsley
Deputy Director, Railway Markets & Economics

26 October 2018

Dear Schedule 4 & 8 Working Group

Final Decision: Proposal for an additional Schedule 4 notification discount factor threshold and review of London and South East notification factors

Background

1. In December 2017[1], we consulted on a range of proposals to amend Schedule 4 notification factors in line with the most recent evidence on passengers' awareness of disruption.

2. Specifically, we consulted on:

   a. a proposed methodology for updates to notification factors;

   b. an update of the notification factors for the three existing notification thresholds in line with the proposed methodology; and

   c. the addition of a new intermediate threshold at 14 weeks ahead of the timetable week of the planned possession.

3. In May 2018[2], we decided that the notification factors relating to the existing three notification thresholds should be updated in line with the methodology we proposed in December 2017 (i.e. we decided to proceed with proposals (a) and (b)).

4. With regard to the proposal to introduce a new intermediate threshold (proposal (c)) the RDG offered to do additional work in response to industry concerns about the proposed timing of the threshold, to be completed by July 2018. We agreed to postpone our decision on proposal (c) to allow us to incorporate the findings of RDG's work.

5. On 20 September 2018, in the light of new evidence about the sensitivity of passenger demand to disruption, RDG also asked us to review our calculation of notification factors for London and South East services, on which we had concluded in May 2018.This letter sets our decisions, and their rationale, in response to both RDG submissions.

[1] http://orr.gov.uk/__data/assets/pdf_file/0005/26294/pr18-consultation-on-amending-schedule-4-notification-factors-2017-12-18.pdf
[2] http://orr.gov.uk/__data/assets/pdf_file/0018/27630/decision-letter-on-schedule-4-notification-factors-2018-05-03.pdf

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RDG consideration of an additional threshold

6. RDG established a working group to look at options for an additional threshold in June 2018. It assessed a range of options developed by a number of passenger operators and Network Rail, including an option for an additional 8-week timetable upload date being included in Schedule 4[3]. Annexe A set out in more detail the process and the options considered by the Working Group. Annex B shows Network Rail's separate submission to ORR.

7. However, there was no overall consensus on the best option, with passenger operators supporting the status quo and Network Rail supporting the option for an 8 week timetable upload.

Our Response

8. In light of the lack of industry consensus and because we do not want to make changes that might impact the timetabling process before we have fully concluded our Inquiry into the recent and widespread timetable disruption, we have decided not to amend the existing notification thresholds.

9. However, given the general support for the proposal we recommend RDG continues its work in this area over CP6 to develop a proposal in time for it to be considered as part of the 2023 Periodic Review.

10. We also note there is limited data currently available regarding when notifications are made. Network Rail currently only records which notification threshold is met (i.e. D-26, T-122 etc.). This means the information available is not particularly granular. Therefore, we are asking Network Rail to consider how it can improve the data available in this area. Specifically, we would like it to be able give more detail about when it actually notifies operators about possessions over CP6. This could also include collecting data on the reasons for late notifications. We hope improved data could help inform efforts to strengthen the incentive on Network Rail to reduce late notice possessions in the next Periodic Review.

[3] RDG notification threshold submission can be found here [LINK]
Network Rail's notification thresholds submission and calculations can be found here {LINKS]

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London and South East notification factors

Summary of the problem

11. A detailed description of the problem, as well the solution proposed by RDG in its submission to ORR, is at Annex C. We set out a high level summary of the issues below.

12. Notification factors are used to discount the amount of Schedule 4 revenue loss compensation Network Rail pays passenger operators. This reflects the lower revenue loss to train operating companies over the long-term from those passengers who are made aware of planned service disruption before they travel, and therefore less inconvenienced. Delay multipliers are an input into the calculation of notification factors. For CP5, delay multipliers were based on evidence from PDFH v5.1.

13. During the 2018 Periodic Review (PR18), new evidence on the sensitivity of passenger demand to disruption became available based on a study by Oxera (the 'Oxera study'). This new evidence was used as part of the PR18 recalibration of London and the South East (LSE) Schedule 8 payment rates by industry. This approach was separately endorsed by the ORR on the basis that the Oxera study is thought to be more robust than the extant PDFH v5.1 evidence

14. The Oxera study implies different levels of sensitivity of passenger demand to disruption and a different methodology for estimating how passenger demand responds to lateness. Specially, it uses a functional form that estimates the relationship between lateness and changes in passenger demand directly, rather than delay multipliers which are used to adjust passenger demand response to changes in journey time to take account of the impact on lateness.

15. Given the decision to adopt the Oxera approach in setting Schedule 8 payment rates for LSE services, RDG argued this new evidence should also be used in the calculation of Schedule 4 notification factors for these services. RDG's proposal for doing this is summarised in the next section.

RDG's proposed solution

16. To address this, RDG submitted a proposal to ORR for revised LSE notification factors based on the Oxera evidence but maintaining the formula through which notification factors are calculated currently. This is done by using delay multipliers *implied* by the Oxera evidence. We emphasise that these parameters are implied because the Oxera study does not explicitly estimate delay multipliers. Implied

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delay multipliers are obtained by adjusting existing LSE delay multipliers so as to generate the same demand response for any given level of lateness as would be obtained by applying the results of the Oxera study directly.

ORR decision

17. In its submission RDG asked us:

    a. to accept the Oxera study as basis for calculating Schedule 4 notification factors; and

    b. to agree its methodology for adjusting LSE delay multipliers for use in calculating LSE notification factors.

18. We accept that the LSE notification factors should be based on the Oxera study evidence.

19. And although arguably simplistic, we accept RDG's methodology for adjusting delay multipliers as a pragmatic way of reflecting the Oxera study evidence in the calculation of LSE notification factors, noting the following points:

    a. industry have agreed to use the approach set out in RDG's submission to ORR for adjusting the notification factors;

    b. the outcome of this approach is to strengthen the incentives on Network Rail to notify passenger operators about planned possessions as early as possible; and

    c. there are limited alternatives to the approach proposed by RDG, given the time available for the recalibration.

20. In light of the above considerations, we approve RDG's revised LSE notification factors for use in CP6.

RDG's revised LSE notification factors

21. Based on their proposed methodology, RDG submitted revised notification factors for LSE services, as set out in Table 1 below. We have included the LSE notification factors on which we concluded in May for comparison.

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Table 1: RDG's revised LSE notification factors

Notification threshold	RDG proposed London & SE Long Distance	RDG proposed London & SE Short Distance	ORR May 2018 London & SE Long Distance	ORR May 2018 London & SE Short Distance
New Working Timetable (D-26)	44%	69%	37%	59%
Informed Traveller Timetable (T-22)	44%	69%	37%	59%
Late Threshold (Applicable Timetable)	92%	90%	91%	86%

Next steps

22. This letter states our final decisions on:

    a. adding an additional notification factor threshold at 14 weeks before the timetable week of the planned possession; and

    b. RDG's review of LSE notification factors.

23. Our decisions are restricted only to the issues on which we have been asked to determine. You should note that we still need to review and approve the detail of how the ACS has been calculated.

Yours faithfully,

Chris Hemsley

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Rail Delivery Group paper to ORR
Options for Schedule 4 notification thresholds

Introduction and Summary

On 3 May ORR issued its decision on Schedule 4 notification factors and concluded that the factors proposed in its December consultation document should apply in CP6[1]. In terms of the consultation proposal for a new intermediate threshold, ORR decided that this should be subject to further consideration and asked the industry to take forward this work and report back by the end of June. RDG established a small working group to carry out the review; the membership of the group is given at the end of this paper.

The purpose of this paper is to describe the findings of the industry review. The RDG working group considered a range of options for Schedule 4 notification thresholds for CP6. Each option is described and discussed in this paper.

Options considered for notification thresholds:

1. No new intermediate notification threshold (the status quo).
2. No new threshold, but new sub-clause in Clauses 9.1 to 9.3 of Schedule 4 in the Track Access Contracts (TAC) to specify a new, additional timetable upload date and associated notification factor.
3. No new threshold, but revisions to Part D of the Network Code (clause 3.5) to set out more specific timescales for the turn-around for late notice possessions.
4. New intermediate threshold as proposed by ORR in its consultation, or a new threshold at an alternative date.

There was industry agreement on dismissing Options 3 and 4, but no consensus on whether to recommend Option 1 or 2 to ORR. **Network Rail (NR) supports Option 2 and train operators support Option 1.**

[1] We note that the factors may be revised to reflect the final Schedule 8 delay multipliers for London and South East commuter services.

Option 1. No new intermediate notification threshold

Under this option there is no change to the policy or process; the existing thresholds would continue to apply but with the revised notification factors confirmed recently by ORR in its letter of 3 May. We assess the other options against this option (the status quo).

The working group considered that there were several merits to Option 1, such as:

1. It avoids the perception that making a change now may be inappropriate given the current problems with the introduction of the May timetable.
2. It does not conflict with the current industry processes set out in the Network Code.
3. It would allow time for a more detailed review of notification factors and thresholds for the next control period if more data was made available.

Option 2. No new intermediate notification threshold, but new sub-clause in TAC to specify a new timetable upload date and associated notification factor

This option would retain the existing notification thresholds at D-26, T-22 and the day before, but would add a new sub-clause in Clauses 9.1 to 9.3 of Schedule 4 of the TAC. The new sub-clause would introduce a new check for timetable upload by T-8, if the possession was notified by T-22. The purpose of the option is to attempt to reflect ORR's latest research and lost revenue impact into Schedule 4 payments.

To illustrate how this option would work, we consider a number of scenarios based on factors for "not London long distance" services as follows:

Notification after T-22

Possessions notified after T-22 but before the day before travel. NR pays compensation at 93% of the full MRE amount (i.e the late notice discount).

Notification before T-22

Possessions notified before T-22 **and** timetables uploaded by T-12. NR pays compensation at 36% of the full MRE amount (i.e the informed traveler discount).

Possessions notified before T-22 and timetables uploaded after T-8. NR pays compensation at 93% of the full MRE amount unless the operator has failed to give its revised access proposal (i.e the late notice discount).

Possessions notified before T-22 and timetables uploaded after T-12 but before T-8. NR pays compensation at X% of the full MRE amount (i.e a new amount set somewhere between the late notice and informed traveler discounts) unless the operator has failed to give its revised access proposal.

The rational is that T-8 is a sensible back-stop for the few occasions when T-12 is missed and provides a much better outcome for passengers and operators than if timetable upload was not achieved until a few days before travel. Whilst not ideal, timetable upload by T-8 would generally allow sufficient time for operators to finalise crew diagrams and rosters and NR was supportive of this deadline.

The new discount factor should be evidence-based (for example, based on the latest ORR research and the additional expenses that an operator would incur as a result of a later timetable upload date).

This approach is not dissimilar to the way that Schedule 4 currently works. The current TAC says that NR receives a notification discount on Schedule 4 payments if possessions are notified by T-22 **and** the timetable is uploaded by T-12. If notification of possession plans is made by T-22 but the timetable is uploaded after T-12 then NR receives the late notice (day before) discount regardless of when the possession was originally notified provided that the timetable upload has not been delayed by the operator.

Pros

- Reflects the latest ORR research and lost revenue impact into the S4 payments – upload by T-8 also reflects more closely the ORR research that showed the majority of journeys being planned and booked after this time.
- It does not conflict with the current industry processes set out in the Network Code.
- It recognises that occasionally T-12 is missed, but it still provides an incentive to upload in a timescale that minimizes the impact on passengers.
- It incentivises NR to turn around plans quicker than currently when Part D timescales are missed.
- It retains the strong incentive to notify possessions by T-22 and upload timetables by T-12, but also provides a financial incentive to upload by T-8 rather than a few days before travel, for the few occasions when things go wrong.

Cons

- Introducing a new factor for timetable upload by T-8 may be perceived badly given the problems the industry has faced in achieving T-12 recently. It could be seen as the industry proposing a less onerous timescale on itself.
- It gives an added level of complexity.
- It compresses the time available for TOCs to finalise rolling stock diagrams, crew diagrams and rosters. While 8 weeks is generally sufficient, it is considered to be the minimum time required for TOCs to finalise their rolling stock diagrams, crew diagrams and rosters.
- It introduces a new process that risks driving changes to industry behaviors that could lead to perverse incentives, although no perverse incentives have yet been identified by the industry.

NR supports this option and although some operators on the working group can see some merit in it, they do not support a change to the regime at the current time. This is primarily because the industry could be seen as promoting later timescales given the current problems in achieving T-12.

Option 3. No new threshold, but revisions to Part D (clause 3.5) to set out more specific timescales for the turn-around for late notice possessions

The current Part D sets out the process if possession plans are notified by T-22. Namely that bids should be made by T-18, offers by T-14 and timetables uploaded by T-12. For late notice variations there is no process and Part D (clause 3.5) just says that timescales should be "**reasonably practical in the circumstances**." This option proposes that the wording is made more specific, for example, for both NR and the TOCs to sign up to timescales for turning plans around within a set timescale of say [4 weeks].

Pros

- The strong incentive to plan and notify possessions before T-22 would remain in place, but the revised wording would impose more discipline and clarity for late notice changes.

Cons

- Requires revisions to Part D which would be difficult to implement in time for CP6.
- It is potentially more complex and not may not be practical to specify a turn-around time that is appropriate in all cases.

There was consensus across the working group that this option should not be recommended. This is because of the added complexity and because there is insufficient time to make changes to Part D.

Option 4. New intermediate threshold introduced into the regime

Under this option a new notification threshold would be introduced. This could be at T-14 as proposed by ORR in its consultation, or at another week.

Pros

- It addresses the perception that if T-22 is missed there is no incentive to notify before the day before travel - but note there is a general view that the industry does NOT think this is actually a problem in practice.
- It better reflects operators' revenue losses experienced as a result of possessions.

Cons

- The potential impact of a new threshold is untested and so not known for certain, however the industry believes that this option could result in unintended consequences. For example, there is concern that this option could undermine the emphasis on early planning and the incentive for notification of possessions by T-22.
- It could legitimise late notice changes.
- It would be misaligned with industry timetabling processes and Part D timescales.

There was consensus across the working group that this option should not be recommended. This is because of the cons listed above, particularly because it is misaligned with existing processes.

Other relevant work on late notice possessions

The industry Operational Planning Strategy Group (OPSG) recently reviewed industry processes for late notice possessions. Towards the end of March OPSG introduced a new process that is likely to have a significant impact on possession planning and industry behavior. In summary the new process provides greater discipline when deciding whether or not to take a disruptive possession and when agreeing the timescales for handling each late notice change. Early indications are encouraging and suggest the new process is resulting in a significant reduction (about 60%) in late change requests.

Membership of the Schedule 4 working group

Robert McCarthy (GTR), Caitlin Scarlett (NR), Russell Evans (First), Simon Doggett (GWR), Gemma Arnold (NR), Nicola Foreman (NR), Peter Swattridge (NR), Dan Boyde (RDG), Tom Wood (RDG), Rebecca Holding (Abellio), Darren Horley (Virgin), Sue Rhymes (Virgin), Andrew Pennington (SWR), Chris Dellard (Arriva Wales), Georgia Ehrmann (Northern), Bill Davidson (RDG).

END OF PAPER

Schedule 4 notification thresholds for CP6
Network Rail submission to ORR

This paper contains Network Rail's submission to ORR on a proposal to reform notification thresholds in Schedule 4 for CP6.

Background

In December 2017, ORR consulted on amending Schedule 4 notification factors for CP6. Specifically, ORR sought views on its proposal to introduce a new notification threshold at 14 weeks before the timetable week of the possession (T-14) to reflect new information about when passengers plan train journeys and book tickets. This proposal sought to address the issues raised by the industry in the Rail Delivery Group's (RDG) Review of Charges, and follows on from RDG's suggestion to "reform Schedule 4 discount structure for notice period of possession". In our response to ORR's proposal, we noted that there could be benefits to introducing a new threshold but that we considered the 14 week threshold could disrupt current industry timetabling processes.

Since ORR's consultation, we have been working with the industry to discuss an alternative option to the 14 week threshold, with the view to making an industry recommendation to ORR. Unfortunately, the industry has been unable to agree a recommendation, but the industry is in agreement about a number of advantages and disadvantages for all options discussed, which are set out in RDG's submission to ORR.

Network Rail's proposal

Network Rail proposes the introduction of a new discount level which would apply if Network Rail provided notification of a possession 22 weeks prior to the possession week (T-22), and uploaded the revised timetable before 8 weeks prior to the possession week (T-8). This is consistent with RDG's "option 2".

Under this proposal, there would be three notification thresholds with associated discount levels (proposed new threshold shown in blue):

	Notification requirement	Timetable upload requirement
Max discount[1]	By T-22.	By T-12, unless the train operator has failed to give Network Rail a revised Access Proposal.
Mid discount	By T-22.	By T-8, unless the train operator has failed to give Network Rail a revised Access Proposal.
Min discount	None.	Applicable timetable (10pm the day before).

[1] This includes the current "early notification" threshold at D-26. ORR concluded in May 2018 that the notification discount factor would be the same for all possessions notified in advance of T-22.

The "max discount" and "min discount" values would be consistent with those set out in ORR's May 2018 conclusions document for Schedule 4 notification factors for CP6[2]. The value of the "mid discount" (i.e. the proposed new discount level) should be based on the awareness of passengers at T-8, taken from ORR's recent research into passenger awareness of planned disruption. This would be consistent with how the Notification Discount Factors (NDFs) are set for the other two thresholds (noting that an adjustment may be required for the London and South East Service Groups). We also propose that each "mid discount" factor includes a 10% uplift[3], to cover any additional costs that operators may incur as a result of slightly compressed planning timescales.

Using this research, and the model that ORR provided alongside its December 2017 consultation, Network Rail has calculated that the NDFs for the new T-8 requirement should be (new NDFs shown in blue):

	London & SE Long Distance	**London & SE Short Distance**	**Not London Long Distance**	**Not London Short Distance**	**Airports**
*Recalibrated on the basis of AECOM research**					
Max discount	37%	59%	36%	60%	31%
Mid discount	50%	69%	49%	71%	45%
Min discount	91%	86%	93%	88%	90%

**The model used to calculate this is contained in the annex to this paper.*

Should ORR decide to implement this proposal for CP6, we recommend that this would be implemented through an amendment to paragraph 9.2 of Schedule 4 of the passenger operator track access contract. We would welcome discussions with ORR's legal colleagues on the appropriate drafting for this.

We also note that the Schedule 4 Access Charge Supplement should reflect this change, which should result in a reduction in the total Access Charge Supplement that Network Rail recovers in CP6.

Reasons in favour of this proposal

Network Rail considers that there would be a number of benefits of implementing this proposal, compared to the current Schedule 4 regime. These are detailed below.

1. The inclusion of the new NDF for timetables uploaded by T-8 would better reflect passenger behaviour, according to ORR's recent research which found that the majority of passengers planned their journeys around 4-5 days in advance (which the current

[2] ORR has recently asked RDG to propose alternative NDFs across all notification thresholds, in light of the changes to the Schedule 8 Network Rail Payment Rates for LSE. We would expect to amend the "mid discount" NDFs to be consistent with RDG's conclusions.
[3] Operators have not provided us with an indication of the extent of any additional costs they may incur, however we consider that 10% is a reasonable uplift to apply in the absence of other information being made available.

Notification Thresholds do not account for). The new NDF would also, therefore, better align Schedule 4 compensation to operators' actual revenue losses.

2. The T-8 proposal would not significantly disrupt industry planning processes, and would allow the train services to be fully and thoroughly planned prior to the possession date. Operators suggested the T-8 deadline, as 8 weeks is the amount of time that operators require to finalise their rolling stock diagrams, train crew rosters etc. for a given timetable.
3. We recognise that introducing a new discount for timetable upload by T-8 would not perfectly align with passenger behaviours (who tend to plan journeys 4-5 days in advance, as noted above). However, we consider that it would strike a good balance between reflecting ORR's latest research and not disrupting important industry processes such as operator rolling stock diagrams, as referenced above.
4. It would provide a strong financial incentive for Network Rail to upload the timetable by T-8, if the T-12 date is missed. This should result in better outcomes for passengers, compared to a later publication date, as passengers would be more likely to be aware of the possession. .This should also provide operators with sufficient time to finalise their train plans (see above), meaning that the alternative train service is less likely to be disrupted on the day.
5. The proposal would not remove the strong incentive on Network Rail to achieve timetable upload by T-12, for two main reasons:
    a. Network Rail would receive a greater Schedule 4 discount for timetable upload at T-12, vs timetable upload at T-8. Therefore, Network Rail would have a strong financial incentive to achieve T-12.
    b. Part D of the Network Code requires Network Rail to upload timetables by T-12. Failure to do so could result in Network Rail being found to be in breach of its license obligation. This therefore provides a very strong incentive on Network Rail to continue to achieve T-12.
6. It would retain the incentive on Network Rail to notify operators of a possession by T-22, given that both the "max discount" and "mid discount" only apply when Network Rail notifies operators of a possession by T-22. Operators have expressed that they value receiving notification of a possession by this date. It would therefore align to the current industry processes for notification of possessions, while recognising that there may, on occasion, be times when the T-12 timetable upload date is missed.
7. We recognise the need for a trade-off been simplicity (i.e. keeping the number of thresholds small) and accuracy. However, we consider that the introduction of one new discount level would not adversely affect this, especially in light of ORR's decision to combine the T-22 and D-26 thresholds for CP6.

Network Rail has not been provided with compelling evidence or reasoning from other industry parties against the T-8 timetable upload proposal. Whilst we recognise that it may be more straightforward to retain the status quo, we consider that reforming the notification discount structure within Schedule 4 would be beneficial to the industry and passengers for the reasons listed above. We have set out in more detail, below, the reasons why we were unable to support a recommendation to retain the current Schedule 4 discount structure for CP6.

1. Retaining the current Schedule 4 discount structure would mean that, according to ORR's recent research, operators will be overcompensated for possessions which have not been entered into the timetable by T-12, but are entered into the timetable approximately 1 week before the possession is due to take place[4]. The Schedule 4 regime would therefore be unrepresentative of actual passenger behaviour. This could create perverse incentives whereby operators would be financially better off if Network Rail missed timetable upload at T-12. This could result in worse outcomes for passengers.
2. The current notification threshold structure is based on passenger behaviours from over 10 years ago. There have been significant changes in passenger behaviour and the availability and accessibility of train timetables and tickets in recent years, which mean that passengers are now unlikely to book a train multiple weeks in advance. Retaining the current notification thresholds would not recognise the significant change in passenger behaviour, and would result in a Schedule 4 compensation regime which was very out of touch with the reality of passenger planning and ticket buying behaviour.
3. Operators have stated that the work undertaken by the industry Operational Planning Strategy Group[5] (OPSG) removes the need to reform the notification structure within Schedule 4. While we recognise and strongly support the good work that OPSG has undertaken to late notice possessions, we do not consider that this replaces the need for Schedule 4 to compensate operators for possessions appropriately.

We do recognise, however, that the presentation of this proposal needs to be thought through carefully, given the recent issues with the May 2018 timetable update. The section below discusses this in further detail.

Presentation of proposal

The recent issues with the May 2018 timetables are very unfortunate and have been widely, and publicly, reported. However, we do not consider that the proposal outlined above should in any way be considered as Network Rail trying to reduce the importance of T-12. Network Rail will continue to strive to achieve timetable publication at T-12 in all situations. The T-12 date is aligned to current industry processes, and is also set out in the Network Code. Network Rail faces severe ramifications if it deviates from the Network Code, and so Network Rail would continue to face extremely strong financial and reputational incentives to achieve T-12 in all cases. This proposal does, however, recognise that there may be a small number of cases when T-12 is missed, and provides Network Rail with a modest financial incentive to upload the timetable by T-8 (currently, if T-12 is missed Network Rail would be financially indifferent to publishing the timetable at T-8 compared to publishing the timetable the day before the possession). As noted above, a T-8 upload would be much better for operators, as it would allow them to complete their train planning. This, in turn, should result in better outcomes for passengers; the majority of which should know about the disruption prior to planning their journey, if the timetable is published 8 weeks in advance.

[4] As the majority of passengers plan and book journeys 4-5 days in advance, publishing the timetable 1 week in advance of the possession will result in a large number of passengers being aware of the possession at the time of booking.
[5] The RDG submission contains further information about this work.

The issue with the May 2018 timetable is a one-off event. There have been no timetable issues of this scale in the recent past, and we do not expect there to be changes of this scale again, in the near future. The periodic review is a once-in-a-5-year opportunity to reform Schedule 4 to reflect latest evidence of passenger behaviour, which could result in better outcomes for both operators and passengers. It is important that we take this opportunity to make this change now, rather than implementing an out-dated Schedule 4 regime for a further 5 years (at least).

Finally, we note that one of the contributing factors to the May 2018 timetable issues was the late publication of the timetable (at T-6). Operators have told us that timetable publication by T-8 allows them sufficient time to finalise their train planning. Therefore, we do not consider that the May 2018 timetable issues suggest in any way that this proposal is inappropriate.

It is for these reasons that we do not consider that the May 2018 timetable issues should prevent reform to Schedule 4, which could result in better outcomes for passengers and more accurate compensation to operators.

CP5 NDFs

Source: Table 20.13 of PR13 Final determination, page 802

Average Late time multiplier	By new working timetable	By 22 weeks before possession	By applicable timetable
4.3 or higher	40%	63%	85% of MRE payable
3.4 to 4.2	45%	65%	85% of MRE payable
2.8 to 3.3	50%	68%	85% of MRE payable
2.7 or less	55%	70%	85% of MRE payable

Data from AECOM work

Source: Final Aecom report

Table E1: PANEL – Q7A Thinking about that journey, how far in advance of travel had you planned to make the journey? By market segment

How far in advance of travel had you planned to make the journey?	Market Segment					
	London & SE Long Distance	London & SE Short Distance	Not London Long Distance	Not London Short Distance	Airports	All
Immediately before travelling/spontaneous	4%	7%	4%	10%	0%	6%
Earlier on the day of travel	6%	16%	5%	18%	7%	11%
One day in advance	10%	16%	8%	14%	8%	12%
2-3 days in advance	16%	23%	23%	23%	17%	20%
4-6 days in advance	14%	11%	13%	9%	16%	12%
7-14 days in advance	20%	13%	18%	14%	7%	16%
Two to four weeks in advance	15%	8%	15%	6%	17%	11%
More than 4 weeks but less than 8 weeks in advance	8%	3%	10%	3%	14%	6%
8 weeks or more but less than 12 weeks in advance	4%	1%	3%	1%	3%	2%
12 weeks or more in advance	4%	3%	2%	4%	10%	3%
Base	**1665**	**1609**	**800**	**671**	**169**	**5155**
Mean number of days	16.1	8.4	14.5	9.4	23.4	12.5
Median number of days	10	2.5	5	2.5	10	5

EXCLUDES COMMUTERS (Weighted) 242 cases missing segment

Table E1a: Disrupted Travellers –How far in advance of travel had you planned to make the journey? By market segment

	Market Segment					
	London & SE Long Distance	London & SE Short Distance	Not London Long Distance	Not London Short Distance	Airports	All
Immediately before travelling/spontaneous	4%	8%	6%	9%	4%	6%
Earlier on the day of travel	10%	22%	5%	15%	9%	12%
One day in advance	8%	24%	14%	20%	2%	16%
2-3 days in advance	12%	14%	11%	15%	7%	13%
4-6 days in advance	11%	9%	13%	10%	9%	11%
7-14 days in advance	17%	10%	13%	11%	15%	13%
Two to four weeks in advance	13%	6%	15%	5%	13%	10%
More than 4 weeks but less than 8 weeks in advance	13%	2%	12%	6%	20%	9%
8 weeks or more but less than 12 weeks in advance	6%	1%	5%	3%	4%	4%
12 weeks or more in advance	7%	3%	7%	5%	17%	6%
Base	**283**	**250**	**344**	**225**	**46**	**1151**
Mean number of days	21.6	8.1	21	12.9	33.6	17.3
Median number of days	10	1	10	2.5	21	5

Excludes commuters

Table E4: PANEL – Q7B Thinking about that journey, how far in advance of travel had you bought a ticket for the journey? By market segment

	Market Segment					
	London & SE Long Distance	London & SE Short Distance	Not London Long Distance	Not London Short Distance	Airports	All
Immediately before travelling/spontaneous	27%	56%	24%	58%	21%	36%
Earlier on the day of travel	11%	15%	5%	16%	8%	11%
One day in advance	10%	9%	9%	4%	8%	9%
2-3 days in advance	11%	6%	17%	4%	16%	10%
4-6 days in advance	9%	4%	10%	7%	9%	8%
7-14 days in advance	10%	4%	14%	4%	16%	9%
Two to four weeks in advance	9%	2%	12%	2%	11%	7%
More than 4 weeks but less than 8 weeks in advance	7%	3%	5%	4%	3%	5%
8 weeks or more but less than 12 weeks in advance	4%	0%	3%	2%	6%	2%
12 weeks or more in advance	2%	1%	1%	0%	3%	2%
Base	**1230**	**695**	**642**	**418**	**135**	**3256**
Mean number of days	11.6	4.2	9.9	4	13	8.4
Median number of days	2.5	0	2.5	0	2.5	1

EXCLUDES COMMUTERS AND SEASON TICKET HOLDERS (Weighted)

Table E4a: Disrupted Travellers – how far in advance of travel had you bought a ticket for the journey? By market segment

	Market Segment					
	London & SE Long Distance	London & SE Short Distance	Not London Long Distance	Not London Short Distance	Airports	All
Immediately before travelling/spontaneous	12%	32%	14%	33%	9%	20%
Earlier on the day of travel	19%	45%	22%	35%	26%	28%
One day in advance	11%	8%	11%	6%	2%	9%
2-3 days in advance	16%	5%	12%	6%	19%	11%
4-6 days in advance	8%	3%	9%	5%	7%	7%
7-14 days in advance	8%	3%	11%	6%	12%	8%
Two to four weeks in advance	12%	2%	8%	2%	14%	7%
More than 4 weeks but less than 8 weeks in advance	7%	1%	6%	4%	2%	5%
8 weeks or more but less than 12 weeks in advance	5%	1%	5%	2%	5%	3%
12 weeks or more in advance	1%	0%	1%	2%	5%	1%
Base	**273**	**168**	**335**	**210**	**43**	**1033**
Mean number of days	12	2.3	11.2	6.4	13.9	8.9
Median number of days	2.5	0.5	2.5	0.5	2.5	1

EXCLUDES COMMUTERS AND SEASON TICKET HOLDERS

Delay Multiplier

	London & SE Long Distance	London & SE Short Distance	Not London Long Distance	Not London Short Distance	Airports
LTM	3.9	2.3	3.9	2.3	6

Proportion of passengers 'aware' at 8 weeks

		London & SE Long Distance	London & SE Short Distance	Not London Long Distance	Not London Short Distance	Airports
Panel Survey	Based on when respondents planned their journey	89%	90%	92%	87%	86%
	Based on when respondents booked their journey	67%	43%	72%	41%	71%
DT survey	Based on when respondents planned their journey	84%	87%	83%	82%	75%
	Based on when respondents booked their journey	81%	67%	79%	64%	82%
Average		80%	72%	82%	69%	79%

Implied notification factors using passenger awareness at 8 weeks

		London & SE Long Distance	London & SE Short Distance	Not London Long Distance	Not London Short Distance	Airports
Panel Survey	Based on when respondents planned their journey	34%	49%	32%	51%	28%
	Based on when respondents booked their journey	50%	76%	46%	77%	41%
DT survey	Based on when respondents planned their journey	38%	51%	38%	54%	38%
	Based on when respondents booked their journey	40%	62%	41%	64%	32%
Average		40%	59%	39%	61%	35%

Increase in notification discount factor to reflect additional costs incurred by operators: 10%

Network Rail proposed notification discount factors for T-8 timetable upload (option 2):

	London & SE Long Distance	London & SE Short Distance	Not London Long Distance	Not London Short Distance	Airports
Recalibrated on the basis of AECOM research					
Mid discount	50%	69%	49%	71%	45%

Amending Schedule 4 NDFs for LSE Service Groups

Executive Summary

The industry made a collective decision to adopt the Oxera-based approach in Schedule 8 for LSE flows. This change also needs to be reflected in the connected Schedule 4 regime. As it currently stands the NRPR used in Schedule 4 is consistent but the Notification Discount Factor (NDF) still uses CP5 parameters.

Unless this is changed compensation under Schedule 4 will not fully compensate for TOC revenue loss, which is likely to cause a host of problems in CP6. For example, this discrepancy is greatest when meeting Informed Traveller timescales giving TOCs a considerable financial incentive to work outside the agreed industry timeline.

The new NDFs calculated by this approach for LSE sectors are as follows:

	London & SE Long Distance	**London & SE Short Distance**
New Working Timetable (D-26)	44%	69%
Informed Traveller Timetable (T-22)	44%	69%
Late Threshold (Applicable Timetable)	92%	90%

These values now need to be incorporated into the ACS proposal and the relevant part of the TAC for specifying the Schedule 4 calculation.

Background

Schedule 4 and Schedule 8 are intended to be calibrated to compensate a TOC for the planned and unplanned lateness (respectively) suffered by its passengers over which it has no control. Both historically, and in future during CP6, this is achieved by formulae that multiply an amount of lateness by a rate representing the revenue loss per minute.

For various reasons, rather than calculating two separate rates (one each for Schedules 4 and 8) the approach is to calibrate a rate for Schedule 8 (the "NRPR") and a "discount factor", which is multiplied by the Schedule 8 rate to determine the rate to be used for Schedule 4. The Schedule 8 rate quantifies the loss from one minute of unplanned lateness; however, when lateness is planned (e.g. line closure due to engineering work) a proportion of the market will be unaware of these changes (and thus behave as per Schedule 8), while the remainder are aware (and so respond differently).

The purpose of the Notification Discount Factor (NDF) is to adjust the Schedule 8 rate to reflect the smaller losses suffered when a proportion of passengers are aware of changes. It also serves to incentivise NR to plan engineering works effectively and in a timely manner – since earlier notification provides a greater level of awareness among the travelling public, the factors for earlier notification provide a greater discount on the Schedule 4 compensation paid.

In CP5 the Schedule 8 rates were calculated on the basis of a "Delay Multiplier" approach. That is, one minute of unplanned lateness is converted into a minute of planned lateness using the Delay Multiplier and the revenue effect determined using research on passenger response to timetable changes (via Generalised Journey Time (GJT)). Specifically, the Marginal Revenue Effect calculated to determine the Schedule 8 rates was defined as

$$\text{MRE} = \frac{-1 \times \text{Revenue} \times \text{Delay Multiplier} \times \text{GJT elasticity}}{\text{GJT}}$$

Thus, when setting the NDFs for Schedule 4, it was sufficient to "remove" the effect of the Delay Multiplier for the aware passengers, giving

$$\text{NDF}_p = p \times \frac{1}{\text{Delay Multiplier}} + (1 - p),$$

where p denotes the proportion of aware passengers as identified in passenger research for each sector.

Problem

For CP6, as part of PR18, the industry agreed to update the research underpinning the calculation of the Schedule 8 rates, in the light of new evidence (the "Oxera study"). This evidence only applied to London and South East flows (LSE), so only these flows were modelled using the new approach: the remainder continue to be modelled using the CP5 approach shown above. However, the Oxera study does not use Delay Multipliers; instead directly modelling the effect of lateness on revenue.

In parallel, the recalibration of Schedule 4 has been taking place, but is largely unchanged in approach from CP5. In particular, there has been no appetite from industry to alter the framework for determining the value of one minute of planned lateness in Schedule 4. Simultaneously, the ORR has determined to amend the Notification Thresholds (with which the NDFs are aligned) and update the corresponding levels of assumed passenger awareness. As a result, the current position is that NDFs in CP6 will still be calculated using the formula above, using the CP5 Delay Multipliers, across all service groups including LSE, where the new Oxera methodology is being used.

Independent TOC analysis, and comments from Steer (who calculated the CP6 Schedule 8 rates), show that the rates obtained using the Oxera study are, on average, lower than those that would have been calculated using the CP5 approach.[1] Given that the Delay Multiplier approach is accepted as a valid modelling technique, this discrepancy suggests that the CP5 Delay Multipliers for LSE flows are much higher than those implied by the Oxera study. Since we are required to use Delay Multipliers for the NDF calculation, the conclusion is that the current position of NDFs is

[1] GWR analysis shows that the Delay Multiplier implied by the Oxera study could be as much as 50% lower than the CP5 Delay Multipliers. This suggests that the NDFs for the earliest thresholds could be as much as 37.5% too low (based on awareness at 75%).

inconsistent with the Schedule 8 rates they are to be used with for LSE service groups. In particular, since the Delay Multipliers implied by the Oxera study are lower than the CP5 Delay Multipliers, it follows that the currently-proposed CP6 NDFs for LSE service groups will be *too low*.

Consequence of "Do Nothing"

If no changes are made to the NDFs, then the Schedule 4 compensation received by TOCs for LSE service groups will be considerably less than the revenue losses they actually suffer. That is, these TOCs will be under-compensated *on expectation*. This would serve to undermine the much more detailed recalibration of the NR Payment Rate being undertaken: the NDF would be the weak link in the Schedule 4 formula.

Moreover, the reduction in Schedule 4 monies would act as a perverse incentive, for TOCs to block proposed RoUs, particularly towards the end of a franchise, or to defer agreement until the later thresholds have passed. It is worth noting it is possible to miss the T-22 notification deadline and for TOCs to still achieve the requisite T-12 publication timescales. This is clearly not in the interests of any industry party, nor of the travelling public.

Proposed amendment

It is proposed to adjust the Delay Multiplier used in the NDF calculations for LSE service groups. The intention with the adjustment is that the new NDFs for these service groups will reflect the implied Delay Multiplier for a "typical" service group. This is to be achieved by assessing all LSE flows together. Specifically, the approach is to calculate

$$\frac{\sum_{\text{LSE flows}} \text{MRE}_{\text{flow}}}{\sum_{\text{LSE flows}} \widetilde{\text{MRE}}_{\text{flow}}}$$

where $\widetilde{\text{MRE}}_{\text{flow}}$ denotes the MRE that would have been obtained for that flow using the CP5 approach (i.e. if it had not been an LSE flow). As described above, this will capture the ratio between the Delay Multiplier implied by the Oxera study and the CP5 Delay Multiplier used in the NDFs. This factor will be applied to the Delay Multiplier used for calculating NDFs for LSE service groups.[2]

This approach is somewhat simplistic but is realistically the only feasible approach available in the time remaining to correct this inconsistency. This correction will ensure that the LSE sector of the industry is, overall, on expectation correctly compensated under Schedule 4. It is worth noting that while this does not reflect the nuances or specific make-up of any given service group, neither does the current proposed structure for NDFs, which simply assigns one of five NDFs to each service group. There has been no recalibration workstream to address this as part of PR18, and this proposal does not intend to introduce more complication to a simplified approach the industry accepts.

[2] The ORR has already publicly shared their spreadsheet that is used – with Delay Multipliers and assumed awareness levels – to determine the NDFs for service groups in a given sector.

New NDF Proposal

Steer's analysis has identified an overall ratio across the LSE sector of 75.24%. This has been used in the ORR's own NDF calculation spreadsheet ("pr18-spreadsheet-of-notification-factors-calculations.xlsx" from an email from ORR to PDFC dated 12th January) to amend the CP5 Delay multiplier.

	London & SE Long Distance	London & SE Short Distance	Not London Long Distance	Not London Short Distance	Airports
LTM (CP5)	3.9	2.3	3.9	2.3	6
OXERA Adj Factor	75.24%	75.24%	100%	100%	100%
New Equiv LTM	2.93	1.73	3.90	2.30	6.00

The ratio has been applied to the 'London & SE Long Distance' and 'London & SE Short Distance' sectors only to generate a new equivalent delay/lateness multiplier. The other sectors have a ratio applied of 100% and remain unchanged.

Using the awareness factors, from the AECOM research, already found in the ORR's spreadsheet and switching in these new delay multipliers yields the following Notification Discount Factors:

	London & SE Long Distance	London & SE Short Distance	Not London Long Distance	Not London Short Distance	Airports
New Working Timetable (D-26)	44%	69%	36%	60%	31%
Informed Traveller Timetable (T-22)	44%	69%	36%	60%	31%
Late Threshold (Applicable Timetable)	92%	90%	93%	88%	90%

The NDF has increased by just over a sixth for Informed Traveller timescales for both LSE sectors and a negligible additional amount for Late Threshold notification. This change against the previous published 'CP5' values can be found in the following Table. This confirms that the other three sectors have remained unchanged in this new proposal.

	London & SE Long Distance	London & SE Short Distance	Not London Long Distance	Not London Short Distance	Airports
New Working Timetable (D-26)	+7%	+10%	0%	0%	0%
Informed Traveller Timetable (T-22)	+7%	+10%	0%	0%	0%
Late Threshold (Applicable Timetable)	+1%	+4%	0%	0%	0%

Although the changes seem relatively modest compared to the original MRE ratio, this is as a result of it being only one part of the overall NDF equation shown on page 1 reflecting the proportion of aware passengers in that sector identified by AECOM's research.

Appendix - Detailed justification of approach

At CP5 all flows were modelled using the PDFH v 5.1 advice as per the following formula

$$\text{MRE} = \frac{-1 \times \text{Revenue} \times \text{Delay Multiplier} \times \text{GJT elasticity}}{\text{GJT}} \qquad (1)$$

This approach to modelling MREs continues to be valid – it was used to model non-LSE flows at CP6. LSE flows were modelled differently, using new research – the implication being that some of the parameters in (1) are incorrect for LSE flows. Let us consider each of the parameters in (1) in turn:

- **Delay Multiplier:** These parameters were last reviewed on the publication of PDFH v5.1, around 5 years ago. The latest version of the PDFH (v6, published within the last year) has moved away from using a Delay Multiplier approach to modelling unplanned disruption, so these figures have not been updated. However, for PR18 the ORR determined that the PDFH v5.1 figures should be used for those flows where there is no other evidence (that is, non-LSE flows).
- **GJT elasticity:** These parameters were extensively reviewed for PDFH v6, which concluded that the PDFH v5.1 values remained the best guidance for all sectors. Consequently, we can conclude that these figures capture the relationship between timetable changes and demand, irrespective of the relationship between unplanned disruption and demand.
- **GJT:** This parameter is derived for each flow based on the timetable, capturing elements related to journey time, service frequency and changing trains. The value for each flow is calculated using a computer model that applies the approach laid down in the PDFH. This approach remains the same in PDFH v6 and therefore reflects the best estimate of passenger perceptions of journey time, also being consistent with the GJT elasticities described above.

Reviewing the above, it is observed that the GJT and its elasticity are correct (or at least as correct as can be expected) for all flows. Thus, for LSE flows, it can be concluded that it is the Delay Multiplier that is incorrect.

For CP6, LSE flows have been modelled using the Oxera study as

$$\text{MRE} = -1 \times \text{Revenue} \times \text{Lateness semi-elasticity} \qquad (2)$$

Equating the RHSs of (1) and (2) yields

$$\text{Lateness semi-elasticity} = \frac{\text{Delay Multiplier} \times \text{GJT elasticity}}{\text{GJT}}$$

Or equivalently

$$\text{Delay Multiplier} = \frac{\text{GJT} \times \text{Lateness semi-elasticity}}{\text{GJT elasticity}} \qquad (3)$$

Thus, for any given flow, with a certain GJT, we can infer the Delay Multiplier implied by the Oxera study. Given that the elasticities and semi-elasticities are

Flow sector	GJT elasticity
London to/from London	-0.9
London to/from SE	-1.25

Flow sector	Lateness semi-elas (F)	Lateness semi-elas (R)	Lateness semi-elas (S)
London to/from London	-0.113	-0.065	-0.044
London to/from SE	-0.021	-0.031	-0.021

Using (3) we can compute the implied Delay Multiplier for a typical London to/from London and London to/from SE flow, with a GJT of 30 and 60 minutes respectively:

Flow sector	Implied DM (F)	Implied DM (R)	Implied DM (S)
London to/from London	3.8	2.2	1.5
London to/from SE	1.0	1.5	1.0

Since the PDFH v5.1 Delay Multipliers for these sectors vary between 2.3 and 3.0, it is clear that the Delay Multipliers implied by Oxera are largely lower than those specified in PDFH v5.1 which are currently proposed to be used in calculating the NDFs for Schedule 4.[3]

In order to correct this, it is proposed to determine the "average" amount by which the (implied) Oxera Delay Multipliers differ from the PDFH v5.1 Delay Multipliers used in the NDF calculation. This proportion will then be used to adjust the Delay Multipliers used in the NDF calculation for LSE service groups.

To do this it is proposed to calculate

$$\frac{\sum_{\text{LSE}} \text{MRE}_2}{\sum_{\text{LSE}} \text{MRE}_1} \qquad (4)$$

Where MRE_i denotes the MRE calculated according to equation (i) (taking PDFH v5.1 Delay Multipliers in (1)). Since the premise of using (1) as modelling mechanism is sound, it can be deduced that the calculation in (2) is identical to the calculation in (1) *provided the parameters are consistent*. Hence, as above when we equated (1) and (2) to obtain (3), it follows that

$$\text{MRE}_2 = -1 \times \text{Revenue} \times \text{Lateness semi-elasticity} \equiv \frac{-1 \times \text{Revnue} \times \text{Oxera-equivalent DM} \times \text{GJT elasticity}}{\text{GJT}} \qquad (5)$$

Using (5), we obtain (after cancelling)

$$\frac{\text{MRE}_2}{\text{MRE}_1} = \frac{\text{Oxera-equivalent Delay Multiplier}}{\text{PDFH v5.1 Delay Multiplier}}$$

thus implying that (4) is a revenue-weighted average of this factor.

This factor will then be used to adjust the Delay Multipliers used in the NDF calculation sheet. From above, it is clear that typically the Oxera-implied (that is, correct) Delay Multipliers are lower than those proposed in the NDF calculation. This creates an inconsistency in Schedule 4.

Note that failing to adjust the NDFs ("do nothing") means that the Schedule 4 compensation received by LSE TOCs is typically less than their actual losses. This will incentivise TOCs to prevaricate in accepting RoUs, forcing NR past the late notice threshold. As a result, NR will be expected to pay more late-notice compensation than they are funded for through the ACS. Note that this also breaks the "ambivalence" of the system (i.e. a TOC should not care whether NR takes possession and pays Schedule 4, or if NR doesn't and the TOC takes revenue as usual). This is likely to lead to rejection of all but emergency (late-notice) works, causing industry rancour and preventing the efficient operation of the whole system. It is likely that there are other unintended consequences and perverse incentives that are not captured above or currently unforeseen.

It is worth noting that, for certain LSE service groups, the proposed gap between NDFs for the two thresholds is from ~0.4 for "early" notification and ~0.9 for "late" notification. Assuming this is based on a Delay Multiplier of 3, this implies awareness of 90% and 15% respectively. For a London to/from SE flow of 60 mins GJT, taking the more accurate (see above) Delay Multiplier of 1.5 gives, with these levels of awareness, NDFs of 0.7 for "early" notification and 0.95 for "late". Comparing with the proposed regulatory NDFs for this flow above, illustrates that whilst both NDFs are wrong, the level of discrepancy is highest between the two "early" figures. In fact, there is less discrepancy between the "do nothing" late factor and the "adjusted" early factor than there is between the two early factors. This clearly indicates the approach a commercial organisation will take, i.e. pushing to just achieve late-notice compensation at 0.9 NDF (against a revenue loss of ~0.7 NDF, since the threshold is only just missed), rather than accepting compensation at 0.4 NDF (against a revenue loss of 0.7 NDF).

[3] The exception is the Full revenue on London to/from London, which is higher; however, we might expect GJTs to be lower at peak times, when service frequencies are higher. Taking a GJT of 20 minutes for Full revenue implies a DM of 2.5, which is then consistent with the PDFH v5.1 value.