The PPP Arbiter

Reference for directions and guidance from London Underground Ltd in respect of the Periodic Review of Tube Lines' PPP Agreement

Draft directions on costs and related matters and initial thoughts on ISC setting and financing

17 December 2009

Role and approach of the Arbiter

The role of PPP Arbiter was created by the Greater London Authority Act 1999 to give guidance or directions on matters relating to the London Underground PPP Agreements. Although appointed by the Secretary of State for Transport, the Arbiter is independent of Government and of the Parties to the PPP Agreements.

In giving guidance or directions, the PPP Arbiter is under a statutory duty to act in the way he considers best calculated to achieve four objectives:

- to ensure that London Underground has the opportunity to revise its requirements under the PPP Agreements if the proper price exceeds the resources available;
- to promote efficiency and economy in the provision, construction, renewal, or improvement and maintenance of the railway infrastructure;
- to ensure that if a rate of return is incorporated in a PPP Agreement, and taking into account matters specified in the Agreement, a company which is efficient and economic in its performance of the requirements in that PPP Agreement would earn that return; and
- to enable the Infracos to plan the future performance of the PPP Agreements with reasonable certainty.

The Arbiter is also under a duty to take account of any factors which are notified to him by both Parties to an Agreement, or are specified in the relevant PPP Agreement, as ones to which he must have regard.

Following consultation, the Arbiter has adopted the following aim for his work, and that of his Office:

> *The aim of the PPP Arbiter and his Office is to give sound and timely guidance and directions on relevant aspects of the PPP Agreements when this is requested, and to work constructively with the Parties to the PPP Agreements in support of their key objective of providing to the public a modern and reliable metro service in a safe, efficient and economic manner.*
>
> *We seek to achieve this by:*
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> - *working within a clear, transparent and consistent framework;*
> - *giving reasoned guidance and directions which are based on well developed analysis shared with the Parties and procedures which achieve predictability in process and outcome;*
> - *establishing effective dialogue with the PPP Parties and other stakeholders to facilitate timely response to requests for guidance or direction, while maintaining our independence; and*
> - *operating to high standards of accountability in all our actions.*

Further information on the functions, duties and approach of the Arbiter can be found on the Arbiter's website http://www.ppparbiter.org.uk

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Section 1: Executive summary, including draft directions and draft guidance

1. The reference and the Arbiter's approach

Matters referred

1.1 On 23 September 2009, London Underground Limited (London Underground) made a reference to the Arbiter for directions and guidance pursuant to sections 229(1) and 230(1)(b) of the Greater London Authority Act 1999 (the GLA Act) in relation to its PPP Agreement with Tube Lines Limited (Tube Lines).

1.2 The Reference Application Notice, setting out the matters referred by London Underground and on which directions and/or guidance are sought, is at Annex 1. The matters referred comprised the following main elements:

- directions on Notional Infraco costs and performance revenues in the second 7½ year Review Period (RP2)[1], including finance requirements in RP2 and the expected Notional Infraco position at the end of the first 7½ year Review Period (RP1), and guidance on the required level of closures to deliver the capital programme;
- directions on Tube Lines' contentions in respect of material change in risk and financing impossibility; and
- guidance, followed by directions, on Infrastructure Service Charge (ISC) requirements in RP2.

1.3 Tube Lines submitted a formal response to reference on 17 November, which is attached at Annex 2.

1.4 The provisions in the PPP Agreement relevant to Periodic Review are principally Schedule 1.9 to the PPP Agreement, including Annex 2 which contains joint guidance to the Arbiter[2]. All references to the PPP Agreement are to this Schedule and Annex 2 to it unless otherwise stated.

Process and timetable

1.5 In its reference, London Underground requested that draft directions should be issued by December 2009. This timetable was requested in order to ensure that sufficient time was available for the later stages of the Periodic Review process, including raising any finance required and completing contract documentation, in order for this to be in place by the start of RP2 (1 July 2010).

1.6 Following a post reference meeting on 23 September, and in the light of representations from Tube Lines about the timetable sought by

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[1] RP2 covers the period 1 July 2010 to 30 December 2017.

[2] Available at http://www.tfl.gov.uk/tfl/corporate/modesoftransport/tube/pppcontracts/3_2_449_1.asp .

London Underground, the Arbiter consulted stakeholders[3] on the general process he proposed for the reference, as he is guided to do by the Parties. He envisaged a two stage process for the reference:

- draft directions on costs, performance revenues and the contention on material change in risk, and draft guidance on closures allowances, together with consultation on 'initial thoughts' on the ISC, financing and affordability issues to be published on 17 December, with the directions and guidance finalised on 2 March; and
- draft directions on the level and profile of the ISC, financing and related issues, following receipt of advice from the 'financial adviser of international repute' (FAIR) appointed by the Parties under the terms of the PPP Agreement, to be published on 2 March with the directions finalised on 27 April.

1.7 The Arbiter considered representations from Tube Lines, London Underground and their stakeholders. His view, taking into account that he had given over the past year clear indications of the timescales which he considered were necessary and achievable for the orderly completion of a Periodic Review reference[4], that Tube Lines would have started preparing much of the information required for the reference prior to the reference being made in the context of its Response to Restated Terms, that the initial phase of the Reference leads to draft directions with significant further time for Tube Lines to refine its representations once these are available and the potential consequences of delaying the review so that revised contractual terms do not take effect at the commencement of the second review period on 1 July 2010, was that the overall the timetable gave the Parties a fair opportunity to comment and best reflected both his statutory duties and the guidance from the Parties.

1.8 The Arbiter published the timetable and approach to the reference on 6 October 2009[5]. He confirmed the two stage process for the reference and the proposed timetable.

1.9 Because the request for guidance in respect of closures was made by only one of the Parties, the Arbiter has discretion as to whether to give

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3 Defined by the PPP Agreement to include "in the case of LUL, its holding company, Transport for London, the Mayor and any Minister and in the case of Infraco providers of equity and debt finance" (Annex 2, paragraph 3(b)).

4 See, for example Procedural approach to Periodic Review, 2 March 2009 and the earlier version dated 2 June 2008 at http://www.ppparbiter.org.uk/output/page25.asp?DocTypeID=10.

5 Announcement 01/09, 6 October 2009 at http://www.ppparbiter.org.uk/files/uploads/i_pressNotices/2009106104942_061009%20Timetable%20announcement.pdf. Following representations from Tube Lines, the Arbiter has made minor modifications to the timetable for the later stages of the review – see Announcement 02/09, 16 December at http://www.ppparbiter.org.uk/files/uploads/i_pressNotices/200912169473_16%20Dec%2009%20Timetable%20update.pdf.

it or not[6]. The Arbiter confirmed to the Parties on 5 October his decision to give this guidance given that, in assessing costs and revenues for the Notional Infraco, he would in any case need to consider these matters.

1.10 Since the reference was made, the Parties provided further guidance to the Arbiter under paragraph 6.5 of matters on which they held a common view, reflecting the outcome of their engagement on contractual obligations since June. This guidance was initially issued on 25 September, and updated on 11 December. The Parties have also provided a draft of proposed guidance under paragraph 6.6 in relation to the leasing of trains for the Piccadilly Line, although no such guidance has so far been issued to the Arbiter.

1.11 The Parties have made representations to the Arbiter on preparatory reports prepared by his advisers. These reports, which were provided to the Parties on 23 September, were based on analysis of Tube Lines' Response to Restated Terms[7] dated 30 June 2009 and London Underground's informal submission to the Arbiter on the same date. The Parties have also made representations on matters covered in an issues paper provided on 14 October, and have updated their projections for RP2 and beyond to take account of the agreed matters covered by the joint paragraph 6.5 guidance. The Arbiter has taken account of all representations made to him in his draft directions and guidance.

1.12 In parallel with the reference to the Arbiter, Tube Lines has referred its contention that the Restated Terms are technically unachievable as a consequence of the proposed Minor Closure allowances for resolution under the Dispute Resolution Agreement (DRA) provisions of the PPP Agreement. The outcome is still awaited, but has no direct implication for the Arbiter's draft directions and guidance.

Summary of Parties' submissions

1.13 Each of the Parties has submitted two full sets of cost and revenue projections. As indicated above, the first set preceded the reference and were used by the Arbiter to prepare for a possible reference. The second set of projections were submitted by each Party to the Arbiter on 17 November, in line with the process and timetable he had set down for the reference. The main difference between the two submissions was updating to reflect the agreement on scope and other matters as reflected in the paragraph 6.5 joint guidance to the Arbiter.

1.14 In total, Tube Lines' 17 November submission proposed costs of £5.75 bn. London Underground considered that the appropriate level of costs was £4.0 bn.

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6 Greater London Authority (GLA) Act 1999, section 230(2)(b).

7 Under the provisions of the PPP Agreement, London Underground issued its Restated Terms for the remainder of the PPP contract period to Tube Lines on 8 December 2008.

Basis of directions and guidance

1.15 The directions and guidance generally take the Restated Terms as their basis. However, in its Response to Restated Terms, Tube Lines made a number of contentions under paragraph 3 of Schedule 1.9 which were not resolved when the reference was made. The contentions made by Tube Lines relate to:

- financing impossibility;
- London Underground's Restated Terms not complying with the terms of the PPP Agreement; and
- Restated Terms involving a material increase in risk.

1.16 The first and third of these contentions have been referred to the Arbiter for direction. Where the validity of Restated Terms is challenged, London Underground has the option to proceed with a reference to the Arbiter but must modify the terms or provide substitutes pending resolution of the disputed items. Such resolution is through the DRA. In its Statement of Case, London Underground provided alternative drafting, for the most part agreed with Tube Lines. This drafting has been adopted for the purpose of the Arbiter's draft directions and draft guidance.

1.17 The Arbiter notes that much of the drafting associated with the matters covered by the paragraph 6.5 guidance is not yet finally agreed between the Parties. Where contract amendments or changes to standards have been notified to him as agreed, these have been adopted for the purposes of these directions as if they were part of Restated Terms. Where a contract or other change has not been agreed, or is considered by the Parties to be unnecessary, the Arbiter has taken a view as to whether the Notional Infraco would adopt the position agreed by the Parties. Where he has concluded that it would not, this is clearly stated in section 3 of this document, with reasons. In addition, the draft directions do not generally reflect the updated paragraph 6.5 guidance, given its late notification to the Arbiter. His final directions will take account of all paragraph 6.6 guidance notified to him in good time, to the extent that he considers appropriate.

1.18 The Parties have been discussing an alternative indexation mechanism which would remove from Tube Lines the risk of projecting differential inflation[8]. There have also been discussions on the future form of the Extraordinary Review mechanism and the relationship with risk amounts included in the Notional Infraco costs. In the absence of agreement between the Parties on these matters, the current draft directions are made on the basis that the existing provisions remain unchanged.

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8 Differential inflation is the movement in costs relative to prices generally, which for the purposes of the PPP Agreement is measured by RPIX (RPI excluding mortgage payments). Where figures include an assessment of differential inflation, bur not general inflation, they are referred to as being in 'real terms'. Any references in this document to 'prices' at a particular date mean that these differential inflationary movements are not included in the relevant estimates.

The Arbiter's analytical approach

1.19 The conceptual basis for establishing costs and revenues at Periodic Review is a Notional Infraco. This is defined in the PPP Agreement, and in broad terms is an Infraco with the same contractual obligations, third party contracts and financing arrangements as the actual Infraco, but which also carries out its activities in an overall efficient and economic manner and in accordance with Good Industry Practice. Given this definition, the Arbiter is required to consider Notional Infraco performance in both RP1 and RP2. The Parties have given the Arbiter further guidance on the Notional Infraco concept, which includes the principle that it assesses operating and capital costs as it would when entering into a contract after a competitive tendering process.

1.20 The Arbiter's Analytical Approach to Periodic Review was published in March 2009[9] and described the information and analysis on which the Arbiter proposed to draw in a broad based Periodic Review cost reference in assessing Notional Infraco costs and revenues. He has adopted this Analytical Approach in responding to the current reference.

1.21 In line with the Analytical Approach, costs and revenues have initially been considered in their component parts of:

- asset specific costs including contingency;
- central costs (including engineering access);
- overlays for differential inflation, risk and efficiency; and
- performance revenues.

1.22 In developing his draft directions and guidance, the Arbiter has been supported by his Office and has been advised by:

- Halcrow as technical advisers;
- Steer Davies Gleave as performance advisers;
- CEPA as economic advisers;
- KPMG as commercial and financial advisers;
- Lloyds Register Rail (BSL) as benchmarking advisers; and
- Shearman & Sterling as legal advisers.

1.23 These advisers have considered a wide range of evidence including internal and external benchmarking data, expert advice opinion and judgement, the Parties' representations and the routine information that is provided by the Parties to the Arbiter.

1.24 The basis of the Arbiter's draft directions and guidance is described in more detail in section 3 of this document. Supporting technical reports prepared by the technical, performance and economic advisers have

[9] Analytical Approach to Periodic Review, 2 March 2009 at http://www.ppparbiter.org.uk/files/uploads/g_proceduralFrameWork/200932163542_Analytical_Approach_to_Periodic_Review0309.pdf

also been provided in confidence to the Parties to the reference. These reports will be updated in the light of representations on the draft directions and guidance and published with the final directions and guidance in March next year.

2. Draft directions and draft guidance

2.1 This chapter contains the Arbiter's formal draft directions and guidance on the matters referred by London Underground.

Cashflows

2.2 London Underground has sought a direction pursuant to paragraph 1.5(a)(i) of Schedule 1.9 as to the amount and timing of the relevant cashflows, including:

(i) the amounts of any anticipated Base Finance and/or the amounts of any Eligible Finance required; and

(ii) the amounts (if any) included in the negative cashflows arising from the RP1 pension deficit.

London Underground has requested that the Arbiter should include in this direction a statement of:

(i) the performance and resultant revenues the Arbiter considers would be earned by a Notional Infraco, broken down into Capability, Availability, Ambience, Specific Project Adjustments and Service Points (as set down under Performance "P" in the OPPPA DBS), and an explanation of how each of these has been taken into account in cashflows covered by direction; and

(ii) the Notional Infraco RP1 closing position.

2.3 The relevant positive (revenue) and negative (cost) cashflows are set out in paragraphs 7.2 and 7.3 of Schedule 1.9 to the PPP Agreement. The Arbiter's current draft directions cover only the cashflows in paragraphs 7.2 (a/b), 7.2 (b), 7.2(f) and 7.3(d). The Arbiter has received no notifications pursuant to paragraph 6.6, and therefore makes no draft direction pursuant to paragraphs 7.2(e) or 7.3(e). For the reasons set out in chapter 1, the Arbiter is not making draft directions on other cashflows relating to financing matters at this stage. His initial thoughts on how he might develop directions in respect of these other cashflows are set out in chapter 3.

(i) Operating and capital costs

2.4 The largest element of the relevant cashflows is "the operating and capital costs of the Notional Infraco in performing its activities after the Review Date" (paragraph 7.2 (a/b) and (b)).

2.5 The PPP Agreement guides the Arbiter to give his direction on the best estimate of operating and capital costs "on the basis (in relation to paragraph 7.2(b)) that the aggregate of all the amounts allowed in respect of the operating and capital costs of a Notional Infraco after the Review Date shall be the best estimate of such amounts as would be agreed to by a Notional Infraco when entering into a contract after a competitive tendering process in respect of the relevant activities having regard to:

(x) the risks associated with individual activities (including the risk of cost overruns and ISC Adjustments);

(y) the risk that a Notional Infraco may have to undertake activities which it has not expected to have to carry out; and

(z) the probability that in the management of a portfolio of activities, the actual cost of some individual activities will exceed the costs allowed, and the actual costs of other individual activities will be less than the costs allowed."

In addition, the Parties have given joint guidance to the Arbiter that, in making his estimate of Notional Infraco costs, he should have regard to factors including the following (paragraph 6.7 of Annex 2 to Schedule 1.9):

"(a) the costs actually incurred by all Infracos who are party to PPP Contracts with LUL in the period prior to the Review, to the extent that these are incurred with efficiency and economy and in accordance with Good Industry Practice;

(b) efficiency savings that can reasonably be expected based on the experiences of other Infracos and other participants in markets relevant to the Infraco's activities;

(c) reasonable expectations about trends of these costs taking account of likely trends in input costs to the Infracos;

(d) trends in costs that have been exhibited in similar industries in the past;

(e) cost implications of changes in LUL's performance and/or contractual requirements including appropriate provision for contingencies."

2.6 The Arbiter has assessed the strategies that a Notional Infraco might adopt to deliver its contract obligations in both RP1 and subsequent contract periods. In doing this, he has received advice from expert advisers and from his office. His analysis has separately identified base costs and overlays for efficiency, differential inflation and risk.

2.7 Assessment of Notional Infraco costs and revenues in RP2 also requires the Arbiter to take a view of performance in RP1, in order to reach a view on whether the Notional Infraco and actual Infraco start RP2 in the same position in terms of contract delivery and cost base.

2.8 A key underlying assumption of the Arbiter's analysis is that the client facilitates the delivery of the efficient work programme – in other words the Notional Infraco faces a notional client. This assumption reflects, for example, the guidance from the Parties to the Arbiter about their intention to work in partnership.

2.9 The Arbiter's assessment of Notional Infraco strategies and costs in RP1 suggests two main differences from the approach and costs of Tube Lines itself, in respect of stations and line upgrades.

2.10 The Arbiter's assessment of Notional Infraco stations capex costs exceed Tube Lines' expected costs that were agreed as part of the PPP bidding process by over £400m. Tube Lines has also experienced overall cost increases compared with the baseline at Transfer and its actual costs are close to those established for the Notional Infraco. Given that stations costs increased materially for the former Metronet Infracos, it is clear that stations work was underpriced by all bidders, given the scope of work expected by London Underground. This increase in costs could contribute to Net Adverse Effects under the Extraordinary Review mechanism, to the extent that it is not the subject of a contractual claim.

2.11 In respect of line upgrades, the Parties gave guidance to the Arbiter in the PPP Agreement that Transmission Based Train Control (TBTC) signalling, and a single contract for both the Jubilee Line and Northern Line upgrades, is an approach which a Notional Infraco could propose. Tube Lines entered into a contract with Thales to deliver TBTC based using their SelTrac system in 2003. At the point of contract signature, however, significant elements of the approach, including the application of London Underground standards, were not settled and responsibility for many risk items not apportioned.

2.12 Taking into account good practice from line upgrades carried out by other metros internationally, the Arbiter has assumed that a Notional Infraco would have adopted an alternative procurement and contracting strategy. The approach he has assumed as the basis of establishing Notional Infraco costs is to commence procurement only when the functional specification for the project had been developed and agreed with London Underground. The contract would therefore have been let after any changes to the signalling supplier's standard software necessary to enable fitment on the London infrastructure had been considered and changes to standards had been agreed, at least in principle, with London Underground.

2.13 As a result of this alternative procurement approach, the Arbiter's assessment is that the Notional Infraco would deliver the Jubilee Line upgrade at lower cost than actually incurred by Tube Lines and in line with the timing in the PPP Agreement. As a consequence, the Notional Infraco would have made significantly more progress in RP1 with the Northern Line upgrade than has actually been the case, with less work (and cost) remaining in RP2 than Tube Lines itself is projecting.

2.14 The Arbiter has also made an assessment of the Notional Infraco's central costs, and of performance and other revenues in RP1. The resulting projections, compared with the contractual Baseline for Net Adverse Effects (BNAE), is set out in the table below.

Table 2.1: RP1 base costs – Tube Lines' submission and Arbiter's assessment compared with the Baseline for Net Adverse Effects (BNAE)

Asset Area	Tube Lines' submission	Arbiter's assessment	BNAE
	£m February 2008 Prices		
Rolling stock capex	171	197	215
Rolling stock opex	678	668	719
Signalling capex	772	473	611
Signalling opex	164	202	178
Depots	28	16	30
Track & civils capex	22	0	0
Trains and Line upgrades	**1,836**	**1,555**	**1,753**
Premises & systems capex	829	887	457
Premises & systems opex	307	305	241
Lifts and Escalators capex	130	112	207
Lifts and Escalators opex	110	97	103
Stations	**1,375**	**1,401**	**1,008**
Track capex	282	309	303
Track opex	236	263	191
Civils capex	46	56	94
Civils opex	52	58	114
Infrastructure	**616**	**686**	**702**
Variations, Transition and Special Projects	**464**	**464**	**464**
Total asset costs	**4,291**	**4,106**	**3,926**
Central costs	**1,253**	**1,009**	**1,094**
Other cash adjustments	**211**	**211**	**368**
Total base costs[10]	**5,755**	**5,327**	**5,388**

Source: Arbiter's cost model and the JNP Infraco Baseline for Net Adverse Effects at Transfer.

2.15 The analysis set out above excludes possible income from claims. The PPP Agreement has a claims mechanism that is covered by the contractual Dispute Resolution Agreement (DRA), which is separate

[10] In all tables in this document, totals may not add due to rounding.

from both the Extraordinary Review and Periodic Review processes. In essence, the Extraordinary Review process is designed to deal with changes in costs of delivering contractual obligations; the claims mechanism covers additional costs incurred as a result of the client not operating in accordance with the contract.

2.16 The Arbiter sought representations from the Parties on the extent to which London Underground's behaviour as a client should be reflected in his assessment of Notional Infraco costs and revenues. Tube Lines argued that London Underground's behaviour had increased its costs and that the impact extended beyond what might be recoverable through claims. London Underground, in contrast, argued that some of the issues identified by Tube Lines could have been addressed under the contract by a Notional Infraco.

2.17 The Arbiter has not been persuaded that he should make a specific allowance in Notional Infraco costs, in either RP1 or RP2, to reflect the behaviour of London Underground as client under the contract. That is not to say that its behaviour has not in some cases added to costs. Rather, the Arbiter considers that these are matters which are properly the subject of claims.

2.18 The Arbiter notes that Tube Lines has made claims against London Underground totalling £727m during the course of RP1 and claims of more than £500m are currently pending resolution. This figure includes claims in respect of stations and additional costs and delays on the Jubilee Line upgrade. To the extent that these claims, particularly that in relation to the introduction of TBTC, are upheld, the Arbiter recognises that there are implications for the cost and phasing of RP2 work programmes. He has based his cost projections on the assumption that the Notional Infraco would, like Tube Lines itself, make claims for additional costs arising from behaviour by London Underground which is not in accordance with the terms of the PPP Agreement.

2.19 Given this treatment of costs which are the subject of claims, the Arbiter's conclusion is that the Notional Infraco would have a zero cash balance at the end of RP1 and that it would not have unremunerated Net Adverse Effects in excess of the Materiality Threshold of £236m (February 2008 prices).

2.20 **The Arbiter's draft direction is that the best estimate of the amount of the cashflow referred to in paragraph 7.2(f) is zero.**

2.21 The Arbiter's assessment of operating and capital costs in RP2 builds on the Notional Infraco strategies assumed for RP1. The basis of his assessment is described in more detail in chapter 7. In developing his estimates, the Arbiter has generally followed the initial paragraph 6.5 guidance he has been given by the Parties.

2.22 In RP1, the Notional Infraco is assumed to achieve significant catch up efficiencies. The impact of this is that it enters RP2 with lower costs than the actual Infraco, for example in relation to trains systems which covers rolling stock and signalling opex, where Notional Infraco costs

are assumed to have moved towards (but not reached) the good practice levels suggested by international benchmarking. The work programme for RP2 is then generally priced with limited allowance for further catch up. Frontier shift efficiency is however applied as a separate overlay.

2.23 The Notional Infraco is also assumed to have delivered a higher volume of output in RP1 in certain areas, most notably for the Jubilee and Northern Line signalling upgrade projects, than Tube Lines has actually delivered.

2.24 The latest actuarial valuation of Tube Lines' pension fund is showing a deficit. Tube Lines has argued that contributions to recover this deficit should be included within Notional Infraco costs in RP2; London Underground argues that as the deficit relates to RP1 no such allowance should be made. The Arbiter considers that Notional Infraco would seek to agree a recovery plan which spread contributions over a period. He has allowed costs in RP2 assuming a 7½ year recovery period, amounting to £73m.

2.25 The resulting assessment of Notional Infraco base costs, before overlays for efficiency, differential inflation and risk, are set out in the table below. The Arbiter's assessment is that Notional Infraco costs will be significantly lower than projected by Tube Lines, but somewhat higher than projected by London Underground.

Table 2.2: Total RP2 base costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Prices		
Rolling stock	68	34	3
Signalling	832	386	532
Depots	46	17	0
Track & civils	121	39	0
Line upgrades	**1,068**	**476**	**535**
Rolling stock	1,085	876	978
Signalling & control	194	159	183
Depots	17	16	16
Trains	**1,296**	**1,052**	**1,177**
Premises & systems	704	496	542
Lifts	111	77	37
Escalators	253	154	189
Stations	**1,068**	**728**	**768**
Track	640	515	496
Civils	235	189	186
Infrastructure	**876**	**703**	**681**
Total asset costs	**4,308**	**2,959**	**3,162**
Central costs	881	661	782
Total base costs	**5,189**	**3,621**	**3,943**

Source: Arbiter's cost model

2.26 The Arbiter has considered separately overlays to base costs in respect of efficiency, differential inflation and risk. In doing so, he has taken account of the approach the a Notional Infraco would take in entering into a contract after a competitive tendering process in respect of the relevant activities, as he is guided to do by the Parties.

2.27 The Arbiter considers that a Notional Infraco would continue to reduce its unit costs over time, as the standard of Good Industry Practice continues to improve. Overall, he considers that frontier shift of about

1% a year could be achieved where costs are not already covered by contracts. This would reduce costs in total by about £140m over RP2.

2.28 Under the current terms of the PPP Agreement, ISC is inflated in line with RPIX (RPI excluding mortgage payments). In practice, a Notional Infraco's costs will increase at a different, and possibly faster, rate. This is termed 'differential inflation'. Although such cost increases would, to the extent they were incurred efficiently, be eligible for recovery through an Extraordinary Review, the Arbiter considers that it is appropriate to include an allowance for differential inflation in his cost estimates, as a Notional Infraco would not expect to rely on the Extraordinary Review mechanism alone if differential inflation was expected to be material. Uncertainty about differential inflation would also be reflected by a Notional Infraco in its provision for risk.

2.29 It is particularly difficult to project future cost movements given current macro-economic uncertainties. London Underground's projection for RP2 was for an additional allowance of less than £200m; Tube Lines' estimate was in excess of £400m. Both estimates are, however, below the level assessed by the Arbiter in his Initial Ranges guidance published in September 2008, reflecting the effects of the recession.

2.30 The allowance for differential inflation depends on the level of underlying costs, on assumptions about future price movements and on assumptions about which index is most relevant for different elements of cost. The Arbiter's current assessment is that the best estimate of the differential inflation allowance, reflecting the latest Bank of England assessment about the recovery of the economy, totals just over £170m over RP2. However, the range is wide, and is particularly sensitive to assumptions about the next few years. Accordingly, he considers that a Notional Infraco would include a significant risk premium on this estimate.

2.31 The Arbiter considers that a Notional Infraco would in principle allow for risk under three main headings: asset risk; differential inflation risk and other corporate risks.

2.32 Under asset risk, a bidder for a large contract might generally assess costs at a P80 level (i.e. the level which would be exceeded with only 20% probability). Both Tube Lines and London Underground have also adopted this basis for assessing asset risk. On this basis, the Arbiter considers it is appropriate to allow around £200m for asset risk, about 50% higher than London Underground's assessment. The figure is also higher than Tube Lines' stated risk provision, although it has included some additional contingencies in its base cost assessment.

2.33 As indicated above, the Arbiter considers that a Notional Infraco would make an allowance for differential inflation risk if the only mechanism for recovering this was Extraordinary Review. Although the Parties have been discussing an alternative indexation mechanism, this has not yet been agreed. In the absence of such a mechanism, the Arbiter considers that the wide range in differential inflation projections would lead to a significant risk provision. He has assumed a figure of £160m.

2.34 The Arbiter has allowed £59m in respect of corporate risk – other low probability, but potentially high impact events that would be faced by a Notional Infraco. He has done so on the basis that such events are most properly covered by the Extraordinary Review mechanism. However, without an allowance which matches the Materiality Threshold (£50m before indexation, £59m at February 2008 prices), an efficient infraco would not be able to earn the equity return specified in the PPP Agreement.

2.35 Incorporating these overlays, the Arbiter's assessment of Notional Infraco operating and capital costs in RP2 is as in the table below.

Table 2.3: Total RP2 costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Real Terms		
Rolling stock	68	34	3
Signalling	832	386	532
Depots	46	17	0
Track & civils	121	39	0
Total line upgrades	**1,068**	**476**	**535**
Rolling stock	1,085	876	978
Signalling & control	194	159	183
Depots	17	16	16
Total trains	**1,296**	**1,052**	**1,177**
Premises & systems	704	496	542
Lifts	111	77	37
Escalators	253	154	189
Total stations	**1,068**	**728**	**768**
Track	640	515	496
Civils	194	189	186
Total infrastructure	**876**	**703**	**681**
Total asset costs	**4,308**	**2,959**	**3,162**
Central costs	881	661	782
Total base costs	**5,189**	**3,621**	**3,943**
Differential Inflation	405	184	172
Efficiencies	(130)	(38)	(143)
Risk	302	224	423
Total costs	**5,766**	**3,991**	**4,394**

Source: Arbiter's cost model

2.36 The Arbiter's Initial Ranges guidance on RP2 costs[11] was that costs would be in the range £5.1 - £5.5 bn (February 2007 real terms). Since that guidance was published, London Underground has reduced its

[11] Reference for Guidance from London Underground Ltd: Arbiter's final guidance on the initial range of future costs for Tube Lines, 9 September 2008 at http://www.ppparbiter.org.uk/files/uploads/n_guidance/200898151549_Initial_Ranges Guidance.PDF.

requirements for RP2. In addition, the Parties have agreed that new Piccadilly Line trains will be financed by TfL, so that the only cost to Tube Lines in RP2 will be the lease payments. Taking these changes into account, the range of costs would reduce to about £4.2-4.6 bn (February 2008 real terms). The Arbiter's draft direction for RP2 costs is therefore within the range he previously assessed, on a like for like basis.

2.37 The Arbiter has also considered, as he is required to do by the PPP Agreement, Notional Infraco costs in RP3 and RP4. He has done this on the assumption that the Notional Infraco maintains the same strategies, and that frontier shift efficiencies continue.

2.38 **The Arbiter's draft direction is that the best estimate of the amounts and time of payment and receipt of the cashflows referred to in paragraphs 7.2 (a/b) and 7.2 (b), in February 2008 real terms, are as set out in the following tables:**

Operating and capital costs	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total RP2
	£m February 2008 Real Terms								
Total	**483**	**632**	**605**	**590**	**584**	**550**	**550**	**401**	**4,394**

Operating and capital costs	RP2	RP3	RP4
	£m February 2008 Real Terms		
Total	**4,394**	**4,236**	**3,907**

2.39 The draft cost directions above do not differentiate between the costs of grey assets and other assets. One of the criteria that determines whether Extra Finance is categorised between Base Finance and Eligible Finance depends on whether the expenditure required in respect of grey assets is greater than the ISC proposed by London Underground. The Arbiter will address this issue in his final cost directions if it becomes relevant.

2.40 The Arbiter would expect to update the allowance for differential inflation in these draft directions when making final directions to reflect latest Bank of England inflation assumptions. He will consider whether his final directions should include a provision allowing for further adjustments between the date of final directions and the start of RP2. **He invites the views of the Parties on this.**

(ii) Performance revenues

2.41 Under the terms of the performance regime in the PPP Agreement, an Infraco can earn additional revenue for delivering additional Capability, and can earn bonuses or suffer abatements in respect of Availability, Ambience and Service Points. The contract drafting on the

performance revenues to be taken into account in setting the ISC is ambiguous, with the potential consequence that an Infraco could be rewarded twice for certain elements of performance. The Arbiter has therefore adopted a purposive interpretation of the contract, in line with his statutory duty to ensure that an Infraco which is efficient and economic would earn the equity rate of return specified in the PPP Agreement. He therefore proposes to make a direction relating to performance revenues covered by paragraph 7.3(d) which includes all elements of the performance regime.

2.42 The Arbiter has projected Notional Infraco performance over RP2 based on the work programme assumed, and taking into account the paragraph 6.5 guidance which reflects the result of technical engagement between the Parties on these issues.

2.43 Generally, he has assumed that the Notional Infraco would assume that uplifts in Capability payments only accrue at the Latest Implementation Date in the PPP Agreement, even though its programme of works would have a degree of float. His assessment of Capability revenue is lower than that of London Underground, which assumed early delivery of line upgrade, although somewhat above that of Tube Lines. The Arbiter has projected other elements of the performance regime to take account of assumed Notional Infraco performance in RP1, allowing for some degradation during line upgrades. Whereas the Parties both projected zero net revenues for these elements of the performance regime, the Arbiter's assessment is for a small positive net revenue.

2.44 **The Arbiter's draft direction is that the best estimate of the amounts and time of payment and receipt of the cashflows referred to in paragraph 7.3(d), in February 2008 real terms and broken down into Capability, Availability, Ambience, Specific Project Adjustments and Service Points, are as set out in the following tables:**

Performance revenues	**2010 -11**	**2011 -12**	**2012 -13**	**2013 -14**	**2014 -15**	**2015 -16**	**2016-17**	**2017 -18**	**Total**
	£m February 2008 Real Terms								
Capability	(1)	(12)	(51)	(55)	(72)	(94)	(99)	(74)	(458)
Availability	(7)	(7)	(8)	(6)	(7)	(6)	(6)	(4)	(52)
Ambience	0	1	1	0	1	(0)	0	0	3
Specific Projects Adjustment	0	0	0	0	0	0	0	0	0
Service Points	0	0	0	0	0	0	0	0	0
Total	**(8)**	**(18)**	**(59)**	**(61)**	**(77)**	**(101)**	**(105)**	**(79)**	**(507)**

Performance revenues	RP2	RP3	RP4
	£m February 2008 Real Terms		
Capability	(458)	(745)	(745)
Availability	(52)	(43)	(43)
Ambience	3	2	2
Specific Projects Adjustment	-	-	-
Service Points	0	-	-
Total	**(507)**	**(786)**	**(786)**

N.B. Negative numbers in the tables above are revenues (i.e. negative costs); abatements are therefore shown as positive.

Material change in risk

2.45 London Underground has sought a direction pursuant to paragraph 1.3(b)(i) of Schedule 1.9 as to the correctness or otherwise of Infraco's contention that new or varied obligations introduced by London Underground as part of Restated Terms (modified as set out in the Statement of Case and Initial Submission) involve an increase in risk which is material in the context of Infraco's overall activities. If the Arbiter considers that Infraco's contention is correct, London Underground has also sought guidance as to the specific changes which he considers necessary to Restated Terms to avoid this result.

2.46 The main elements of Tube Lines' contention in its Response to Restated Terms were as follows:

- the inadequacy of the proposed allowances for closures;
- increased risk from the proposed changes to the asset management regime;
- technical unachievability and increased risk arising from the proposed requirements for Piccadilly Line mixed mode operation;
- technical unachievability and increased risk arising from changes in the performance regime; and
- increased risk arising from other contract changes including tax, major enhancements and key sub-contracts.

2.47 The Arbiter notes that many of these matters have been discussed further by the Parties as part of engagement since Tube Lines submitted its Response to Restated Terms, as reflected in the paragraph 6.5 guidance he has received. However, Tube Lines has not withdrawn its contention, and has referred the dispute in respect of closures for determination under the DRA. It has also made representations that the Arbiter should not give directions on this contention pending resolution of this dispute and any further changes in Restated Terms.

2.48 The Arbiter does not consider that it is necessary or appropriate to delay a draft direction on this contention. He has based his draft direction on his understanding of the proposed contractual provisions reflected in the joint guidance to him. If these matters are not reflected in agreed contract drafting (where this is needed to give effect to the agreement between the Parties reflected in the paragraph 6.5 guidance) by the time he makes a final direction on this contention, he will consider whether his direction should include provisions to modify the contract to deliver the agreed changes.

2.49 The Arbiter does not consider that the change in risk can easily be assessed numerically. His approach, therefore, has been to consider whether the Notional Infraco, acting reasonably, would see the contract provisions for RP2 as recognisably the same deal as it signed up to at Transfer. Given his draft direction in respect of costs and performance revenues and his draft guidance on closure allowances (see below), the Arbiter is minded to conclude that contractual provisions modified in line with these draft directions would lead the Notional Infraco to conclude that the deal was in essence the same as it signed up to at Transfer.

2.50 **The Arbiter's draft direction is that the contention that the contractual terms for RP2 involve a material change in risk is not made out.**

Closures

2.51 London Underground has sought guidance as to the allocation of Minor Closures and of Lifts and Escalators (L&E) Closures which would be required by a Notional Infraco for RP2. Under the terms of the GLA Act, the Arbiter may give such guidance as he considers appropriate.

2.52 The Arbiter's approach to assessing Notional Infraco costs involves taking a view on the asset strategies that the Notional Infraco would adopt in RP2, and the resulting work programme. This allows a high level assessment to be made of closure requirements. The Arbiter's assessment is not, however, at a level which allows site-specific closures to be identified.

2.53 As indicated above, the Arbiter has assumed that the Notional Infraco would learn from international practice and adopt a strategy for the Piccadilly Lines upgrade which allows this to be undertaken with significantly less closures than for the Jubilee and Northern Lines. Taking into account the closures required for track work and Line upgrades during RP2, the Arbiter's analysis suggests that the JNP Base Allocation of Minor Closures as set out in Restated Terms is sufficient.

2.54 In relation to lifts and escalators, one of the advantages of the modern standard escalators used in the Notional Infraco strategy is that they can be installed relatively quickly. However the access calculation, which is carried out using average Lost Customer Hours (LCH), rather than a site specific programme given that the Parties did not provide such a programme, suggests that the Base Allocation of L&E Closures

as set out in Restated Terms is insufficient and should be revised upwards to 7.8m LCH.

2.55 **The Arbiter's draft guidance is that the JNP Base Allocation of Minor Closures as set out in Restated Terms of 21.5m LCH is sufficient for the Notional Infraco, and that a provision of 7.8m LCH is appropriate for L&E closures.**

2.56 Given the basis on which the Arbiter has assessed the future work programme and costs of the Notional Infraco, it follows that he considers an access allowance set at these level would be technically achievable for the Notional Infraco.

3. Initial thoughts on ISC setting and financing

3.1 London Underground has sought further directions and guidance as follows:

- a direction pursuant to paragraph 1.4(a) of Schedule 1.9 as to the correctness or otherwise of Infraco's contention that a Notional Infraco would be unable to finance on any basis the continued and future performance of Restated Terms (modified as set out in the Statement of Case and Initial Submission);
- a direction pursuant to paragraph 1.5(a)(i) of Schedule 1.9 as to the amount and timing of the relevant cashflows, including the amounts of any anticipated Base Finance and/or the amounts of any Eligible Finance required;
- guidance in the first instance (pending the advice of the Financial Adviser of International Repute (FAIR) pursuant to paragraph 6.4 of Schedule 1.9) and, following receipt of that advice, a direction as to the ISC to be paid by London Underground from the first Review Date on the basis described in paragraph 1.5(b) of Schedule 1.9. In giving the initial guidance, if the Arbiter considers that Base Finance or Eligible Finance is required, London Underground has requested that he should state an assumption as to the terms on which such finance could be raised (including as to the split between equity and debt) and give the requested guidance on this basis. If he considers that the Affordability Constraints for RP3 and RP4 are insufficient to allow all or part of the Base Finance or Eligible Finance to be raised, London Underground has also requested him to give the requested guidance on the basis that the Affordability Constraints for RP3 and RP4 are deemed modified to the extent necessary to avoid this result, and to state the amount of any such modifications;
- (in accordance with Section 229(3)(b) of the GLA Act) a direction ancillary to the direction requested in respect of ISC to be paid as to the amounts (if any) payable by London Underground in respect of PLU 1 and 2 (PLU) and the Northern Line which have been taken into account in arriving at the determination of the ISC; and
- guidance In the first instance (pending the direction in respect of ISC to be paid) and subsequently a direction, pursuant to paragraphs 1.5(c) and 1.5(d) of Schedule 1.9 as to the fixed amounts and the applicable values of RPIX.

3.2 As indicated above, the Arbiter has concluded that he should not give draft directions on the finance components of Notional Infraco cashflows or guidance on ISC and financing issues at this stage, but instead consult on issues which he will take into account when making draft directions in March 2010, following receipt of advice as appropriate from the FAIR.

3.3 The Arbiter is publishing in parallel with this document a draft of his Analytical Approach to calculating ISC, which sets out his proposed approach in more detail.

3.4 As part of the Periodic Review process, London Underground has set its Affordability Constraints for the remainder of the Tube Lines' PPP Agreement. The Affordability Constraints are defined as London Underground's "best estimate at the time of the levels of payment that it expects to be able to afford to commit to paying to Infraco on and after the next Review Date to cover the ISC". The Affordability Constraints are expressed in nominal terms.

3.5 In order to assess the implications of his draft cost directions, the Arbiter has inflated the figures included in his draft directions, and added his assessment of the fixed amounts in the contract to cover existing financing and tax obligations. As set out in the table below, this suggests a funding gap of about £460 million.

Table 3.1: Arbiter's initial estimate of RP2 affordability gap

£m	RP2
Total costs (Feb 2008 prices)	4,394
Inflation to nominal prices	764
Add: Treasury fees	18
Add: Fixed Amounts	1,928
Working capital adjustment	Assumed nil
Total costs (nominal)	7,104
Less: Affordability Constraints	(6,641)
Initial estimate of affordability gap	463

Source: Arbiter's calculations

3.6 This affordability gap implies that there is a need for additional finance in RP2 if the draft cost directions are confirmed. The gap will increase if Tube Lines makes further successful claims, for example in respect of delay to the Jubilee and Northern Line upgrades. Given the classification of Tube Lines as a Public Corporation, and given the terms of the financial settlement for Transport for London, the full cost of the Tube Lines PPP needs to be afforded within TfL's financial settlement, whoever raises new finance.

3.7 London Underground has previously indicated to the Arbiter that its assessment of affordability in the second Review Period was based on the mid-point of the Initial Ranges numbers, adjusted for changes in Restated Terms, and that it accepted that this level of costs implied a need for further finance. It also confirmed that TfL has discretion over its use of funds and therefore had the capacity for additional finance raised by Tube Lines (or provided directly or indirectly by London Underground) to be accommodated within the TfL business plan.

3.8 The level of costs implied by the draft directions is, adjusting for changes in requirements, within the range set out in the Initial Ranges guidance. **The Arbiter is therefore seeking confirmation from London Underground and its Stakeholders that the costs and performance revenue payments implied by the draft directions remain affordable. If this assurance cannot be given, the Arbiter invites London Underground, pursuant to the objective in section 231(2) of the GLA Act, to identify what changes it would wish to make to the proposed obligations for RP2 in its Restated Terms as amended by the paragraph 6.5 guidance in time for him to reflect these changes in his final directions.**

3.9 If London Underground does not consider that it needs to review and amend its requirements for affordability reasons, the Arbiter will need to decide whether to propose a level of ISC in RP2 which is above the Affordability Constraints or whether to direct that Tube Lines should raise additional finance.

3.10 Any financing by Tube Lines would need to be remunerated and repaid through higher ISC over the remainder of the PPP contract period. Both Parties have previously indicated to the Arbiter that they consider it would be better value for money for TfL to raise additional finance than for Tube Lines to do so, as for example has been agreed in respect of the financing of new trains for the Piccadilly Line. **The Arbiter is therefore asking the Parties to make further representations on whether this remains their position.**

3.11 London Underground has argued that the PPP Agreement requires the Arbiter to set ISC in RP2 at the level set out in its Affordability Constraints (the 'hard cap' approach). The Arbiter does not agree with this interpretation of the contract. He accepts that he is required to set ISC in accordance with the profile (i.e. shape) of the Affordability Constraints, but considers that he is able to adjust the total (the 'soft cap' approach).

3.12 Tube Lines has contended that the hard cap approach to applying the Affordability Constraints would make it impossible for a Notional Infraco to raise the necessary finance. In its Statement of Case and representations, London Underground has accepted that the Affordability Constraints for RP3 and RP4 may need to be relaxed to ensure that any additional Tube Lines financing can be repaid over the life of the contract.

3.13 Given that he is minded to conclude that Tube Lines' arguments in respect of technical unachievability of Restated Terms are not supported, and that he has not been persuaded that the 'hard cap' approach to setting ISC is correct, he is minded to conclude that the contention in respect of financing impossibility has not been made. However, he will not issue a draft direction on this matter until he has considered further representations on the consultation questions set out above and on his draft Analytical Approach to ISC setting.

Section 2: Background and approach

4. The reference

4.1 This chapter:

- summarises the Arbiter's functions and duties;
- describes the reference received from London Underground; and
- sets out the proposed process and timetable for completing the reference.

Arbiter's functions and duties

4.2 The functions and duties of the Arbiter are set out in the GLA Act 1999.

4.3 Matters which may be referred to the Arbiter for direction are specified in the PPP Agreements[12]. When such a matter is referred, the Arbiter is required to give directions in relation to that matter. He may also give directions on matters that are ancillary or incidental to the matter referred. Directions may include addition of new terms to a PPP Agreement, or modification of existing terms. Directions are binding on the Parties unless both Parties agree to the contrary.

4.4 Any matter relating to a PPP Agreement may be referred to the Arbiter for guidance. Where a reference is made by only one Party, the Arbiter has discretion whether or not to give guidance. He has published, following consultation, his approach to deciding whether or not to give guidance in such cases[13]. Where a request for guidance is made by both Parties to a PPP Agreement, he has no such discretion.

4.5 In exercising his functions of giving directions and guidance, the Arbiter is under a duty to act in the way he considers best calculated to achieve four objectives:

- to ensure that London Underground has the opportunity to revise its requirements under the PPP Agreements if the proper price exceeds the resources available;
- to promote efficiency and economy in the provision, construction, renewal, or improvement and maintenance of the railway infrastructure;

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12 These matters are listed in paragraph 1 of Schedule 1.9 to the relevant PPP Agreement (see http://www.tfl.gov.uk/tfl/corporate/modesoftransport/tube/pppcontracts/3_2_449_1.asp). All references to the PPP Agreement are to this schedule and its Annex 2 unless otherwise stated.

13 Procedural Approach to the receipt of an unanticipated request for Guidance, 8 June 2007 at http://www.ppparbiter.org.uk/files/uploads/g_proceduralFrameWork/200848165614_Procedure%203%20Procedural%20Approach%20to%20unanticipated%20guidance%2006_07.pdf.

- to ensure that if a rate of return is incorporated in a PPP Agreement, and taking into account matters specified in the Agreement, a company which is efficient and economic in its performance of the requirements in that PPP Agreement would earn that return; and
- to enable the Infracos to plan the future performance of the PPP Agreements with reasonable certainty.

He is also under a duty to take account of any factors which are notified to him by both Parties to an Agreement, or are specified in the relevant PPP Agreement, as ones to which he must have regard.

Matters referred

4.6 On 23 September 2009, London Underground Limited (London Underground) made a reference to the Arbiter for directions and guidance pursuant to sections 229(1) and 230(1)(b) of the Greater London Authority Act 1999 (the GLA Act) in relation to its PPP Agreement with Tube Lines Limited (Tube Lines).

4.7 The Reference Application Notice, setting out the matters referred and on which directions and/or guidance are sought by London Underground is at Annex 1. The matters referred comprised the following main elements:

- directions on Notional Infraco costs and performance revenues in the second 7½ year Review Period (RP2), including finance requirements in RP2 and the expected Notional Infraco position at the end of the first 7½ year Review Period (RP1), and guidance on the required level of closures to deliver the capital programme;
- directions on Tube Lines' contentions in respect of material change in risk and financing impossibility; and
- guidance, followed by directions, on ISC requirements in RP2.

4.8 Tube Lines submitted a formal response to reference on 17 November, which is attached at Annex 2.

Process and timetable

4.9 Following receipt of the reference from London Underground the Arbiter discussed it and the timetable with London Underground and Tube Lines at a post reference meeting on 23 September. This included considering whether to give the requested guidance on ISC and financing issues ahead of directions, as requested by London Underground.

4.10 In its reference, London Underground requested that draft directions should be issued by December 2009. This timetable was requested in order to ensure that sufficient time was available for the later stages of the Periodic Review process, including raising any finance required and completing contract documentation, in order for this to be in place by the start of RP2 (which is intended to be on 1 July 2010).

4.11 Following the post reference meeting, and in the light of initial representations from Tube Lines about the timetable sought by London Underground, the Arbiter consulted stakeholders[14] on the general process he proposed for the reference, as he is guided to do by the Parties. Given that affordability and financing issues depend crucially on the level of costs which the Arbiter assesses is appropriate for RP2, the Arbiter considered that it would not be appropriate to give guidance on these matters before the level of costs had been settled. Instead, he proposed to consult the Parties on these issues when consulting on draft cost directions as a basis for further directions later in the reference process.

4.12 He therefore proposed a two stage process for the reference:

- draft directions on costs, performance revenues and the contention on material change in risk, and draft guidance on closures allowances, together with consultation on 'initial thoughts' on the ISC, financing and affordability issues to be published on 17 December, with the directions and guidance finalised on 2 March; and
- draft directions on the level and profile of the ISC, financing and related issues, following receipt of advice from the 'financial adviser of international repute' (FAIR) appointed by the Parties under the terms of the PPP Agreement, to be published on 2 March with the directions finalised on 27 April.

4.13 In response to the consultation on timetable, Transport for London, the Mayor and the Secretary of State indicated that they supported the intention to publish draft cost directions before Christmas, in line with the request from London Underground. Tube Lines and its stakeholders raised the following key points in their representations:

- the need to reflect the timescales required by Tube Lines for approval of its key representations given the provisions of the agreements with its lenders;
- the need for Tube Lines to have adequate time to review the material the Arbiter had provided to the Parties, and for the Arbiter to review those representations; and
- the possible benefits of extending the review beyond the Review Date of 1 July 2010[15].

4.14 The Arbiter considered these representations. His view, taking into account that he had given over the past year clear indications of the

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14 Defined by the PPP Agreement to include "in the case of LUL, its holding company, Transport for London, the Mayor and any Minister and in the case of Infraco providers of equity and debt finance" (Annex 2 to Schedule 1.9, paragraph 3(b)).

15 The PPP Agreement contains joint guidance from the Parties that the Arbiter is to "give great weight to the importance of concluding his review and issuing his directions by the Review Date or of making interim adjustment to the level of the Infrastructure Service Charge where there is overall benefit in extending his review beyond the Review Date" (Annex 2 to Schedule 1.9, paragraph 6.9).

timescales which he considered were necessary and achievable for the orderly completion of a Periodic Review reference[16], that Tube Lines will have started preparing much of the information required for the reference prior to the reference being made in the context of its Response to Restated Terms, that the initial phase of the Reference leads to draft directions with significant further time for Tube Lines to refine its representations once these are available and the potential consequences of delaying the review so that revised contractual terms do not take effect at the commencement of the second review period on 1 July 2010, was that the overall the timetable gave the Parties a fair opportunity to comment and best reflected both his statutory duties and the guidance from the Parties.

4.15 The Arbiter therefore confirmed on 6 October the proposed general process and timetable for the reference. He recognised that he would need to keep the timetable under review.

4.16 The Arbiter has since received further representations from Tube Lines on timetable for the later stages of the Periodic Review. Following consultation with London Underground, he made minor modifications to the published timetable on 16 December 2009.

4.17 The Arbiter also confirmed to the Parties on 5 October his decision to give the requested guidance on closures given that, in assessing costs and revenues for the Notional Infraco, he would in any case need to consider these matters.

4.18 In line with the reference process set by the Arbiter, the following steps have preceded publication of this document:

- the Parties provided further guidance to the Arbiter under paragraph 6.5 of matters on which they held a common view, reflecting the outcome of their engagement on contractual obligations since Tube Lines issued its Response to Restated Terms in June[17];
- the Arbiter has provided an issues paper to the Parties, seeking their views on various contractual matters relevant both to draft costs directions and the Arbiter's consultation on ISC and financing issues;
- the Parties provided informal comments on the Advisers' preparatory reports[18] (by London Underground on 20 October and by Tube Lines (which requested and was granted a short extension) on 23 October); and
- the Parties made their final representations to the Arbiter, with updated cost projections, on 17 November.

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16 See, for example Procedural approach to Periodic Review, 2 March 2009 and the earlier version dated 2 June 2008 at http://www.ppparbiter.org.uk/output/page25.asp?DocTypeID=10.

17 Initial paragraph 6.5 guidance was issued on 25 September, and revised guidance on 11 December 2009.

18 These reports are described in more detail in chapter 5.

4.19 The published timetable for the remainder of the process is as follows:

1 February 2010	Final date for representations on draft directions and draft guidance and responses to initial thoughts consultation
4 March	Publication of final directions and final guidance on: • material change in risk • costs • performance revenues • access allowances Publication of draft directions on: • the level and profile of the ISC • need for base/eligible finance • terms of finance • ability to finance • fixed amounts and RPIX
6 April	Final date for representations on draft directions issued on 4 March
29 April	Publication of final directions on: • the level and profile of the ISC • need for base/eligible finance • terms of finance • ability to finance • fixed amounts and RPIX

5. The Arbiter's approach to the reference

5.1 This chapter sets out the Arbiter's approach to the reference and covers:

- work undertaken in preparation for a Periodic Review reference;
- the contractual basis of the directions and guidance; and
- the Arbiter's analytical approach.

Preparatory work for a Periodic Review reference

5.2 The Periodic Review process and the Arbiter's procedures for it have been under discussion with the PPP Parties for more than two years. The timetable for the reference has been a subject of significant debate since the contractual process expects the review to be completed within 18 months. The key stages are:

- London Underground issues restated contract terms (Restated Terms) and sets the Affordability Constraints – December 2008;
- Tube Lines provides a Response to Restated Terms – 30 June 2009; and
- Restated Terms become effective – 1 July 2010.

The Parties can seek directions and/or guidance from the Arbiter at any stage.

5.3 Given the scale of a full Periodic Review, this timetable is challenging. The Arbiter has been keen to ensure that the Parties understood the time that he would require if a broad based reference were made to him and the impact on the process of the Parties making a late reference. He has done this principally through discussion at a tripartite meeting (Tube Lines, London Underground and Office of the PPP Arbiter), which he chairs.

5.4 As part of its preparations for Periodic Review, London Underground made a reference to the Arbiter on 14 April 2008 which sought guidance on the level of costs that would be incurred by a Notional Infraco in RP2 on the basis of unchanged contract terms (the 'Initial Ranges guidance'). This guidance was issued on 9 September 2008[19]. The Arbiter assessed the range of likely costs for RP2 as £5.1- 5.5bn (February 2007 real terms), on the basis of the obligations as then specified.

5.5 On 2 March 2009 the Arbiter published an updated Procedural Approach to Periodic Review (and his associated Analytical Approach, described in more detail below) which captured lessons learned from preparing the Initial Ranges guidance and included a more developed

[19] Reference for guidance from London Underground Ltd: Arbiter's final guidance on the initial range of future costs for Tube Lines, 9 September 2008 at http://www.ppparbiter.org.uk/files/uploads/n_guidance/200898151549_Initial_Ranges Guidance.PDF.

timetable for the Periodic Review process. In this document, the Arbiter indicated that he expected to undertake significant preparatory work in anticipation of a Periodic Review reference.

5.6 Throughout 2009, the Arbiter continued his preparations for Periodic Review. In this preparatory phase, and in developing his draft directions and guidance, the Arbiter has been supported by his Office and has been advised by:

- Halcrow as technical advisers;
- Steer Davis Gleave as performance advisers;
- CEPA as economic advisers;
- KPMG as commercial and financial advisers;
- Lloyds Register Rail (BSL) as benchmarking advisers; and
- Shearman & Sterling as legal advisers.

5.7 In anticipation of a reference, the Arbiter's technical, performance and economic advisers prepared a series of preparatory reports. Initial drafts were developed before Tube Lines made its Response to Restated Terms. The reports were updated subsequently and made available to the Parties at the post reference meeting on 23 September 2009. The advisers considered a wide range of evidence including internal and external benchmarking data, expert advice opinion and judgement, the Parties' 30 June submissions, as well as the routine information that is issued by the Parties to the Arbiter each month.

5.8 The reports represented advice to the Arbiter, and not the views of either the Arbiter or his Office. They comprised the following:

- Assessment of the level of costs incurred by a Notional Infraco in responding to the performance regime in Restated Terms, July 2009 (SDG);
- Notional Infraco strategy – Final report, September 2009 (Halcrow);
- Notional Infraco strategy – Capability and Availability, September 2009 (SDG);
- Administration and Other (A&O) expenditure – Final report, July 2009 (CEPA);
- A&O expenditure – Annexes, July 2009 (CEPA) (including Assessment of accommodation costs, 13 May 2009 (Actium) and The NI IT sizing model, 21 May 2009 (Hackett));
- Further analysis of central costs – Final report, 21 September 2009 (CEPA);
- Frontier shift efficiencies – Final report, July 2009 (CEPA);
- Efficiency survey – Final report, June 2009 (CEPA);
- Further analysis of efficiencies – Final report, September 2009 (CEPA);

- Differential inflation – Final report, 23 June 2009 (CEPA); and
- Further analysis of differential inflation – Final report, September 2009 (CEPA).

5.9 The external benchmarking reports commissioned by the Arbiter and provided to the Parties are as follows:

- International Cost and Performance Benchmarking: Typical Prices for Metro Rolling Stock and Signalling Upgrade, 11 July 2008;
- International Benchmarking of the Costs and Performance on Maintaining and Renewing Metro Systems, 13 January 2009;
- International Benchmarking Study – Additional Data, 12 May 2009;
- International Benchmarking of the Costs and Performance of Maintaining and Renewing Metro Systems – Refresh Project Draft Final Report, 27 October 2009; and
- International Benchmarking of the Costs and Performance of Maintaining and Renewing Metro Systems – Refresh Project Draft Final Report, 17 December 2009.

Some of these reports have been published by the Arbiter[20].

5.10 There have been five phases of joint internal benchmarking, undertaken by Tube Lines and London Underground (covering the former Metronet Infracos). The reports[21] have been made available to the Arbiter, and reviewed by him for robustness, but have not been published.

5.11 In May 2009 the Arbiter issued to the Parties a draft Analytical approach to calculating ISC following discussion with the Parties. In consultation, the Parties indicated that they did not wish the Arbiter to reach a definitive view on certain matters other than in the context of a reference. These matters are discussed further in section 4 of this document.

5.12 On 30 June 2009, Tube Lines submitted its Response to Restated Terms to London Underground and copied it to the Arbiter. On the same date, London Underground made an informal submission to the Arbiter, as it was invited to do in the Arbiter's Procedural Approach to Periodic Review, which was also provided to Tube Lines. There then followed a period of clarification and negotiation between the Parties.

5.13 When it became clear that these discussions were not resolving all the differences between the Parties, London Underground made a reference for directions and guidance to the Arbiter on 23 September.

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20 At http://www.ppparbiter.org.uk/output/page22.asp?DocTypeID=7.

21 Reports used by the Arbiter's advisers include: Joint Benchmarking Phase 3 Report, 31 March 2008; Additional Investigations in the conclusions of the Phase 3 report, 23 June 2008; Joint Benchmarking Phase 4 Report, 18 August 2008; Deep Tube Track Reconditioning Access Productivity Report, 16 December 2008; Individual Line Track and Signalling Maintenance Study, 29 May 2009; and Joint Benchmarking Phase 5 Report, 4 November 2009.

As indicated above, the Arbiter provided the Parties with the reports commissioned from his advisers at the post reference meeting on 23 September.

5.14 The PPP Agreement includes a provision at paragraph 6.5 for the Parties to provide additional joint guidance to the Arbiter on any matter relating to the exercise of his functions on which they hold a common view. As a result of the clarification and negotiation preceding the reference, the Parties reached a common view on a number of matters largely relating to scope of work and they have provided further joint guidance. Initial joint paragraph 6.5 guidance was provided by the Parties to the Arbiter on 25 September, with an update on 11 December 2009.

Basis of directions and guidance

5.15 The directions and guidance generally take the Restated Terms as their basis. However, in its Response to Restated Terms, Tube Lines made a number of contentions under paragraph 3 of Schedule 1.9 which were not resolved when the reference was made. The contentions made by Tube Lines relate to:

- financing impossibility;
- London Underground's Restated Terms not complying with the terms of the PPP Agreement; and
- Restated Terms involving a material increase in risk.

5.16 Where the Restated Terms are disputed in this way, London Underground has the option to proceed with a reference to the Arbiter but must modify the terms or provide substitutes pending resolution of the disputed items. In its Statement of Case, London Underground provided alternative drafting, for the most part agreed with Tube Lines. This drafting has been adopted for the purpose of the Arbiter's draft directions and draft guidance.

5.17 In relation to access, London Underground has revised its projections of the base allocation of both minor closures and lift and escalator closures in its representations to reflect its view of the impact of the initial paragraph 6.5 guidance discussed below[22]. However the internal dispute over the Base Allocation of Minor Closures has now been formally referred to external adjudication by Tube Lines. The adjudicator has not yet made a determination. Accordingly the Arbiter has assumed that this revised formulation is not acceptable to Tube Lines and for the purposes of his analysis he has started from the access allowances provided by London Underground in its Statement of Case.

[22] In London Underground's opinion these revisions mean that Infraco would be well below the allowances provided for the purpose of the reference in London Underground's Initial Statement of Case. In its 17 November representations London Underground states that it "would be willing to make a contractual amendment giving TLL the right to buy, and LUL an obligation to provide (subject to the terms of the Access Code), access above these revised base allocations... up to a maximum allowance (based on TLL's view)."

5.18 The Arbiter notes that much of the drafting associated with the matters covered by the paragraph 6.5 guidance is not yet finally agreed between the Parties. Where contract amendments or changes to standards have been notified to him as agreed, these have been adopted for the purposes of these directions as if they were part of Restated Terms. Where a contract or other change has not been agreed, or is considered by the Parties to be unnecessary, the Arbiter has taken a view as to whether the Notional Infraco would adopt the position agreed by the Parties. Where he has concluded that it would not, this is clearly stated in section 3 of this document, with reasons.

5.19 Paragraph 6.6 enables the Parties to express the terms of any matter that is referred to the Arbiter "so as to advise him that they do not request or require him to consider any aspect of the matter being referred on which they have reached agreement". The Arbiter has been provided with a draft agreement under the provisions of paragraph 6.6 in relation to the lease arrangements for the Piccadilly Line trains, although this is currently unsigned. Given that both Parties have confirmed their intention to enter into such a lease, the Arbiter's draft directions reflect its proposed terms.

5.20 The Parties have been discussing an alternative indexation mechanism which would remove from Tube Lines the risk of projecting differential inflation. There have also been discussions on the future form of the Extraordinary Review mechanism and the relationship with risk amounts included in the Notional Infraco costs. In the absence of agreement between the Parties on these matters, the current draft directions are made on the basis that the existing provisions remain unchanged.

The Arbiter's Analytical Approach to Periodic Review

5.21 The conceptual basis for establishing costs and revenues at Periodic Review is a Notional Infraco. This is defined in the PPP Agreement, and in broad terms is an Infraco with the same contractual obligations, third party contracts and financing arrangements as the actual Infraco, but which also carries out its activities in an overall efficient and economic manner and in accordance with Good Industry Practice. Annex 2 to Schedule 1.9 gives further joint guidance to the Arbiter on how this concept is to be applied.

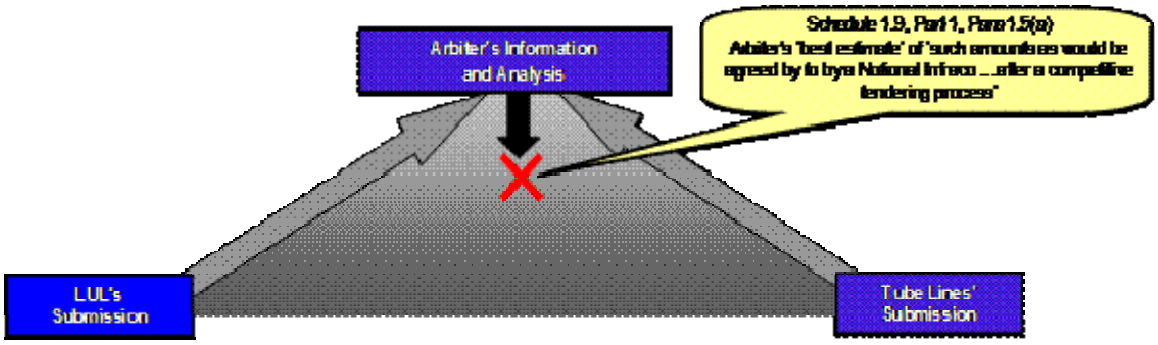
5.22 The joint guidance sets out some of the characteristics of Good Industry Practice, and also sets out some of the principles which the Parties have agreed in assessing efficiency. In order to provide more certainty about the approach he would adopt at Periodic Review, the Arbiter published, after consultation with the Parties, his Analytical Approach to Periodic Review in March 2009[23]. This document described the information and analysis on which the Arbiter proposed to draw in a broad based Periodic Review cost reference. He has

[23] Analytical Approach to Periodic Review, 2 March 2009 at http://www.ppparbiter.org.uk/files/uploads/g_proceduralFrameWork/200932163542_Analytical_Approach_to_Periodic_Review0309.pdf.

adopted this Analytical Approach in responding to the current reference.

5.23 The Analytical Approach document identifies three broad sources of information: submissions from each of the Parties and information and analysis undertaken by the Arbiter's Office and advisers. All three sources of information are used by the Arbiter in reaching his decisions on Notional Infraco costs and revenues, in line with the guidance in the PPP Agreement. This is illustrated in Diagram 1.

Diagram 1: Sources and uses of information for a cost reference



5.24 In a Periodic Review reference, the Arbiter is asked for his "best estimate (that is, the most likely outcome)" of the relevant cashflows, on the basis that "the aggregate of all the amounts allowed in respect of the operating and capital costs of a Notional Infraco after the Review Date shall be the best estimate of such amounts as would be agreed to by a Notional Infraco when entering into a contract after a competitive tendering process..."[24]. The Arbiter considers that this requires a combination of detailed costings and top-down overlays. His approach to the assessment of the appropriate risk allowance, in particular, has reflected his view of the relevant approach in a competitive tender.

5.25 Because the Notional Infraco is defined as the company taking on Infraco's obligations from the date of Transfer (31 December 2002 in the case of Tube Lines), assessment of Notional Infraco costs and revenues in RP2 requires an assessment also of costs and revenues, and contract delivery, in RP1. London Underground's reference in any case seeks a statement from the Arbiter of the Notional Infraco RP1 closing position. The analysis in this document therefore starts from an assessment of Notional Infraco asset strategies in RP1 before considering RP2.

5.26 In line with the Analytical Approach, costs and revenues have initially been considered in their component parts of:

- asset specific costs including contingency;
- central costs (including engineering access);

[24] Paragraph 1.5(a), repeated in the guidance in Annex 2.

- overlays for differential inflation, risk and efficiency; and
- performance revenues.

5.27 In support of the Arbiter's draft directions and guidance, his advisers have updated the reports provided to the Parties in September. In doing so, they have taken account both of representations from the Parties and the initial paragraph 6.5 guidance[25]. The revised reports are being provided to the Parties confidentially, to assist them in making representations on the Arbiter's draft directions and guidance. They are not being published at this stage but will be published when the Arbiter gives his final directions and guidance on cost related matters in March next year.

5.28 The Arbiter's directions on Notional Infraco cashflows in RP2 are at an aggregate level. The assessment of individual components of cost, using both detailed review of cost elements and higher level benchmarking, is therefore only an input to the Arbiter's directions. As the Parties' guidance to the Arbiter recognises, there is a "probability that in the management of a portfolio of activities, the actual cost of some individual activities will exceed the costs allowed, and the actual costs of other individual activities will be less than the costs allowed"[26]. It follows from this, and the concept of Good (rather than 'best') Industry Practice which underpins the Notional Infraco, that a range of different strategies could result in broadly similar total costs. In bringing costs and revenues together, the Arbiter therefore has to use an element of judgement in aggregating costs based on specific strategies, as described in his Analytical Approach to Periodic Review. The Arbiter considers that this approach remains the most appropriate one in developing, as the PPP Agreement requires, his "best estimate" of the relevant amounts.

Structure of the document

5.29 The remainder of this document is structured as follows:

- Section 3 describes the supporting analysis for the draft directions and guidance on costs and related matters; and
- Section 4 contains initial thoughts on ISC setting and financing.

[25] The Arbiter will consider what further changes are required to reflect in his final directions and guidance the updated paragraph 6.5 guidance received less than a week before issue of this document.

[26] Paragraph 6.8(c) of Annex 2.

Section 3: Supporting analysis for draft directions and draft guidance

6. The Notional Infraco's RP1 closing position

6.1 This chapter:

- sets out how the Arbiter has established what a Notional Infraco would have delivered in RP1 and the associated costs;
- describes the revenues that would have been generated by the Notional Infraco as a result;
- provides a comparison of Notional Infraco's performance to the contractual baseline and to Tube Lines' actual performance;
- discusses the influence of London Underground on costs and revenues; and
- states the RP1 closing position that is used as the opening position for the RP2 analysis.

Establishing performance levels and delivery in RP1

6.2 The Arbiter has assessed the performance of the Notional Infraco in RP1 to establish both the starting position for the work programme, cost base in RP2 and the cash position at the end of RP1. The reference asks the Arbiter to provide a statement of the Notional Infraco RP1 closing position.

6.3 As explained in chapter 5, the Notional Infraco is an assumed entity which takes on the PPP Agreement at transfer. This requirement to assess performance in RP1 is a key difference from the Arbiter's Initial Ranges guidance which, as requested, provided a view of RP2 costs without considering in detail RP1 performance.

6.4 Tube Lines uses its own outturn and projected performance as the proxy for the Notional Infraco arguing that its performance is consistent with the performance of the Notional Infraco and that its historic performance information provides the most robust and granular analysis.

6.5 London Underground does not provide an analysis of costs for RP1 but its RP2 costs take a lower start point than Tube Lines' actual costs because it considers that Tube Lines has not performed as efficiently in RP1 as might reasonably be expected from a Notional Infraco.

6.6 Consistent with earlier work on glidepath[27], the Arbiter has assumed that the Notional Infraco is incentivised to improve its performance to a level which is, in the round, consistent with Good Industry Practice within the first 2 – 4 years of the contract. The significant work volumes

[27] Review and Definition of "Glidepath" to Good Industry Practice, Stage 1 and 2 Report, Halcrow Group Limited, 1 June 2007 at http://www.ppparbiter.org.uk/files/uploads/m_goodindustrypractice/200761153934_Halcrow%20NI%20Glidepath%20Stage%201-2%20Report.pdf.

required to deliver PPP obligations give the Infraco opportunities to generate early efficiencies. There are however some specific areas, such as signalling and track maintenance costs, where a longer glide path is used given the scale of catch up efficiency identified by BSL.

6.7 A key underlying assumption of the analysis is that the client facilitates the delivery of the efficient work programme; in other words the Notional Infraco faces a notional client. This assumption reflects, for example, the guidance to the Arbiter about partnership:

“The Parties' guidance to the Statutory Arbiter is that in determining the level of Infrastructure Service Charges the Statutory Arbiter should be mindful of the fact that, in the context of their respective rights and obligations under the PPP Contract, the Parties intend to work in a spirit of partnership, which London Underground described in its Invitation to Tender as follows:

"We are committed to providing the best possible Underground service to the travelling public by:

- working together to improve customer service;
- creating an environment based on mutual respect, trust and fairness that promotes open and honest communication at all levels;
- solving problems together;
- recognising and rewarding those who contribute to the success of the partnership;
- working together to achieve our objectives"”[28].

6.8 The Arbiter’s analysis therefore starts from the assumption that the client would work productively alongside the Infraco to assist its delivery and would encourage change to processes and practices, including changes to standards, where this promotes better value for money or more effective delivery. Tube Lines asserts that London Underground has not acted in this manner, while London Underground considers that, in the round, it has. This is discussed in more detail below.

6.9 The programme of work priced by the Arbiter is consistent with the RP1 contract obligations and access allowances. The following strategies are adopted by asset area.

[28] Paragraph 9 of Annex 2.

Table 6.1: Notional Infraco asset strategies for RP1

Asset area	Key contract driver	Notional Infraco strategy
Rolling stock capex	Jubilee Line specified right	• The only substantive capex item is the Jubilee Line 7th car project for which Tube Lines' own costs are adopted
Rolling stock opex	Standards PPP performance regime: Capability and Availability metrics	• Tube Lines' actual costs used for Piccadilly Line given that these are in line with the international benchmarking good practice range • Savings are applied to the maintenance contract with Alstom for the Jubilee Line fleet at the end of RP1 as it is considered that it would have been possible to move towards the performance levels of the Piccadilly Line when this contract was renegotiated in 2007 • In respect of the Northern Line PFI contract with Alstom, the contract prices are used as this pre-existing contract runs to 2017
Signalling capex	PPP performance regime: Capability and Availability metrics	• The Notional Infraco strategy is to install a TBTC signalling system. • The Thales contract is not adopted as the basis of pricing for reasons discussed further below, although transmission-based train control (TBTC) is assumed • New signalling equipment pricing is based on international benchmarking as are modifications to the trains, enabling works, systems integration and project management
Signalling opex	PPP performance regime: Availability metric	• The Notional Infraco improves the efficiency of signalling maintenance towards levels consistent with GIP, although these improvements are constrained until each of the signalling upgrade projects is completed • Thereafter, significant savings accrue from the adoption of the new technology and the opportunity to rationalise staff levels which arises from this

Asset area	Key contract driver	Notional Infraco strategy
Depots	PPP performance regime: Capability and Availability metrics	• A notional allowance is made using an average of the Parties' estimates given the scale of this cost item
Stations capex	Input specification of PPP contract	• The programme of station modernisations, enhanced refurbishments and refurbishments that are input specified in the PPP Agreement is priced using the methodology established as part of the Metronet BCV Extraordinary Review • Station services work is generally assumed to be undertaken as part of enhancement works • Accessibility works are priced at 6 stations using on Tube Lines RP1 outturn costs • In relation to non stations premises no capex works are undertaken in RP1 • Both actual Infraco and Notional Infraco costs significantly exceed projections at Transfer (as discussed further below)
Stations opex	Contract condition requirements and Ambience metric	• The strategy utilises a bottom up model developed to meet the requirements of statutory regulations, standards and contract condition benchmarks • Some efficiency is delivered but effects are largely offset by the substantially greater asset base created via the capital programme
Lifts and Escalators capex	Contract condition requirements and Availability metric	• The strategy is to consider the asset condition and residual life requirements over the contract life and develop a NPV optimised programme for both asset groups • As asset condition is generally poor at Transfer: those assets with a D & E condition are prioritised in RP1 to ensure that E conditions are removed by the end of RP1 and D reduced in RP1 • The Notional Infraco escalator replacement programme utilises a

Asset area	Key contract driver	Notional Infraco strategy
		modern standard escalator which has both lower acquisition and maintenance costs than models previously used in London • This type of escalator also has the advantage of being easier to install reducing the access requirement
Lifts and Escalators opex	Contract condition requirements and Availability metric	• In the case of escalators, opex costs are assumed to reduce over the course of RP1 as older machines are replaced • The maintenance costs of lifts is assumed to rise in RP1 as a consequence of the new lifts being specified by London Underground i.e. creation of new obligations
Track capex	Contract condition requirements and Availability metric	• Pricing the obligations in this area depend almost entirely on the approach to delivering condition benchmarks • For RP2 the Parties have agreed a scope of work and have provided guidance to the Arbiter to the effect that he should also allow for this scope • Given that the Parties have agreed an RP2 scope that is broadly consistent with that delivered by Tube Lines in RP1, the Arbiter has adopted Tube Lines' RP1 volumes but these have been independently priced
Track opex	Contract condition requirements	• Takes Transfer actual costs as the start point and applies an efficiency saving of roundly 3% per annum to move costs towards the benchmarking range identified by BSL
Civils capex	Contract condition requirements	• The Notional Infraco renewals budget is based on pre-Transfer activity levels which reflect the steady state management of these assets
Civils opex	Contract condition requirements	• Notional Infraco pricing is developed using a independent estimate of resource requirements and allowing for inspection of Grey Assets (for which detailed condition was unknown at Transfer)

Asset area	Key contract driver	Notional Infraco strategy
Power	Limits of the Power PFI contract	• Infraco is responsible for transmission of traction power from the substation to the train. A notional allowance is made within track costs based on an average of the Parties' estimates in this area

6.10 Particular issues arise in respect of the stations programme, line upgrades and central costs. These are discussed further below.

Stations programme

6.11 The Notional Infraco's stations capex costs exceed Tube Lines' expected costs that were agreed as part of the PPP bidding process by more than £400m. Tube Lines has also experienced overall cost increases compared with the baseline at Transfer and its actual costs are close to those established for the Notional Infraco. Given that stations costs increased materially for the former Metronet Infracos, it is clear that the scope of stations work was underpriced by all bidders. This increase in costs could contribute to Net Adverse Effects under the Extraordinary Review mechanism, to the extent that it is not the subject of a contractual claim.

Line upgrades

6.12 The Infraco obligations for RP1 include signalling upgrades to both the Jubilee and Northern Lines. The Jubilee Line upgrade is scheduled for completion by December 2009. The Northern Line upgrade is to be completed in January 2012. The Parties have very different views about the programme and costs for these projects, and the allocation of costs between RP1 and RP2.

6.13 London Underground contends that the upgrades could be completed at lower cost than is proposed by Tube Lines and that schedule delays experienced on the Jubilee Line upgrade did not result from actions of London Underground. In support of this view London Underground refers to a report[29] which cites six reasons for the delay to the Jubilee Line upgrade project noting that only one of these, standards, relates to London Underground. London Underground states that the requirements in its standards, such as Route Secure, were an original PPP contract requirement and were included in both the invitation to tender and contract documents for the signalling contract let by Tube Lines. It argues that Tube Lines allowed insufficient interaction between London Underground as end user and Tube Lines' signalling contractor (Thales), which resulted in the incorrect interpretation of these requirements.

29 Review of the status of the Jubilee Line upgrade for Chief Executive Officer Tube Lines Ltd, October 2009 at http://www.london.gov.uk/assembly/reports/transport/too-close-for-comfort-gaffney-report.pdf.

6.14 In London Underground's opinion the real causes of delay on the Jubilee Line upgrade appear to be a failure of planning and risk management by Thales and an equivalent failure by Tube Lines to manage its signalling contractor.

6.15 London Underground's cost estimates are based on the original contract with Thales. Although, unlike Tube Lines, it does not include the subsequent cost increases and delays since it argues that these would not have been experienced by a Notional Infraco.

6.16 Tube Lines contends that the signalling contract was competitively tendered and that the costs are therefore the efficient costs that would be incurred by a Notional Infraco. It points out that its forecasts of costs for the Northern Line upgrade project are 25% lower than the actual costs of Jubilee Line upgrade. Tube Lines argues that delays to the programme are a result of significant modifications to Thales original SelTrac design insisted on by London Underground. It also considers that London Underground has omitted items from its estimates, for example certain enabling works.

6.17 Tube Lines states that it has considered international benchmarking but has based its forecasts on actual quantities and productivity rates on the Jubilee Line upgrade. It argues that brown-field working is a significant factor and that its line upgrades should not be compared to green-field benchmarks. Tube Lines provided independent reports to support its estimate and considers that its costs compare favourably with the Victoria Line and New York's Canarsie Line upgrades.

6.18 Tube Lines refers to a revised agreement (SA7) with Thales as evidence of sound project management in respect of deciding whether to terminate or continue the Thales contract.

6.19 Both Parties refer in their submissions to differing views on access requirements for the upgrade projects. This is considered further in chapter 11. They also refer to a claim made by Tube Lines in respect of the Jubilee Line upgrade. No account is taken of this claim in the Arbiter's analysis as it will be resolved through the contractual dispute resolution mechanism.

6.20 Given that Tube Lines asserts that it followed an appropriate tendering process for these projects and given the Parties' joint guidance in respect of competitive tenders[30], the Arbiter's analysis started from a review of the approach taken by Tube Lines. The PPP Agreement also contains joint guidance from the Parties to the Arbiter that TBTC signalling and a single contract for both the Jubilee Line and Northern Line upgrades is an approach which a Notional Infraco could propose[31]. However, the Agreement also specifically notes that the Arbiter should not allow for cost increases to the extent that Infraco did not:

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30 Paragraph 6.6 of Annex 2.

31 Paragraph 20 of Annex 2.

"(x) review the appropriateness of each element of the above approach from time to time to take into account information becoming available after the Transfer Date;

(y) execute the elements of the above approach finally adopted by them; and/or

(z) adapt its approach to managing the elements of the above approach finally adopted in the light of changing circumstances,

to the standards required of a Notional Infraco."

6.21 Tube Lines entered into a contract with Thales to deliver TBTC based on its SelTrac system in 2003. At the point of contract signature, significant elements of the approach, including the application of London Underground standards, were not settled and responsibility for many risk items not apportioned. The Arbiter considers that Tube Lines might reasonably be expected to have been aware at the time of the risks that it was taking by contracting at the speed and in the manner that it did, given the potential scale of the software changes required and the absence of agreement on important issues such as the application of London Underground standards to TBTC systems.

6.22 After considering all of the evidence provided by the Parties, including Tube Lines' contractual claim, Tube Lines' board papers and other expert opinion, the Arbiter has not adopted the Tube Lines' contracting strategy as the basis of his analysis of Notional Infraco costs.

6.23 The Arbiter's analysis takes a different approach. Although he also assumes the installation of new TBTC signalling systems and track works and that the Northern and Jubilee Line projects are procured together, the Arbiter assumes that the Notional Infraco would have adopted an alternative procurement and contracting strategy. The approach he has assumed is to commence procurement only when the functional specification for the project had been developed and agreed with London Underground. The contract would therefore have been let after any changes to the signalling supplier's standard software necessary to enable fitment on the London infrastructure had been considered and changes to standards had been agreed, at least in principle, with London Underground.

6.24 The Notional Infraco's strategy for the Jubilee and Northern Line upgrade projects is therefore to develop a conceptual design and procure the signalling contract over a two-year period prior to contract award. This is followed by a two-year period of detailed design for the Jubilee Line upgrade project. Subsequent construction, software development, commissioning and testing lead to a completed Jubilee Line upgrade project by the end of RP1. Trains would be equipped with TBTC equipment and would be able to run using this under the new signalling system. Trains would also retain the original signalling equipment and be able to run under it. The overall time allowed to install the TBTC equipment is three years, allowing the trains to be delivered six months prior to the Latest Implementation Date in order to

allow time for resolution of any problems. Capability revenue is not assumed until the Latest Implementation Date of 31 December 2009.

6.25 The Northern Line upgrade is assumed to follow on from the Jubilee Line upgrade and to benefit from project establishment work undertaken for the Jubilee Line upgrade project. The Northern Line work would follow a similar schedule to the Jubilee Line and would be delivered by the contractual date of 7 January 2012.

6.26 To establish Notional Infraco costs for the Jubilee and Northern Line upgrade projects, the Arbiter has considered costs of signalling upgrade projects at other metros. The Arbiter considers that a Notional Infraco operating in accordance with Good Industry Practice would have been able to achieve the average level of costs of other brown-field projects, excluding costs for the Canarsie line, which is considered to be an outlier. However, an adjustment is made for London specific factors which are assumed to increase costs by 30%.

6.27 Enabling works which cover a range of activities not covered by the main signalling contract are included within signalling costs as are project management costs of 15% and, for the Jubilee Line project only, establishment costs of 20%. The resulting assessment of Notional Infraco line upgrade costs is set out in the table below.

Table 6.2: RP1 upgrade costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Prices		
Rolling stock	0	19	26
Signalling	767	523	467
Depots	15	7	0
Track & civils upgrades	22	30	0
Line upgrades total	**803**	**580**	**493**[32]

Source: Arbiter's cost model

Central costs

6.28 The Arbiter has also considered the level of central costs that would have been incurred by a Notional Infraco in RP1. His approach has been more high level than in the case of asset base costs. His approach has been broadly as follows:

[32] In the Arbiter's analysis, line upgrade depot costs are accounted for as part of rolling stock and depots.

- to assume Tube Lines' actual costs reflect Notional Infraco costs until the end of 2003-04, given that these are reflective of the position inherited by the Notional Infraco at Transfer;
- to take costs consistent with the external benchmarks used to develop RP2 costs for the period from 2007-08 to the end of RP1; and
- between 2004-05 and 2007-08, to assume that a Notional Infraco would catch-up to costs consistent with the external benchmarks.

6.29 In relation to Other and Exceptionals and overheads costs, the Arbiter has based his cost estimates on Tube Lines' actual RP2 costs, adjusting for double counting of A&O costs and project management costs (in line with similar adjustments made in RP2).

6.30 In assessing separately identified central costs[33], the Arbiter has used a mixture of contractually specified amounts (such as the minor works allowance), actual costs (such as Tube Lines' view of costs and revenues for the Scarce Resource business units) and amounts calibrated according to Notional Infraco base costs (such as secondment fees).

6.31 As described in the Arbiter's Initial Ranges guidance, secondment fees paid to Tube Lines' shareholders are high and potentially outside of market norms for this sort of contractual arrangement. Paragraph 18 gives guidance to the Arbiter that these agreements were "an acceptable position from which to start performance of the Infraco Obligations", and also about circumstances in which the Arbiter might conclude that they are inconsistent with the Infraco performing its obligations in an overall efficient and economic manner and in accordance with Good Industry Practice.

6.32 Whatever its contracting strategy, the Arbiter would expect a Notional Infraco to keep all existing contracts under review to assess whether renegotiation or termination would allow it to deliver better value for money, taking account of the costs of modifying the contract. The Arbiter notes that these contracts were expected to run for a period of at least 15 years. He also notes that Tube Lines renegotiated the secondment agreements in 2007 to increase flexibility of work allocation between Bechtel and Amey. On reviewing the revised agreements, he has concluded that, provided payments under the agreements reflected his direction on Notional Infraco costs, a Notional Infraco would retain these contracts. Accordingly secondment fees in both RP1 and RP2 have been calculated based on the formula specified in the secondment agreements but based on the Arbiter's assessment of Notional Infraco operating and capital costs rather than those of proposed by Tube Lines.

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[33] These costs include costs that Tube Lines is contracted to pay under secondment agreements with its shareholders, 'lumpy' capex costs e.g. for IT and amounts contracted under the PPP Agreement e.g. for Minor Works.

6.33 The 2007 revision did not change payment rates. The Arbiter therefore considers that the retention of the secondment agreements merits the application of higher efficiency amounts on the basis that the Notional Infraco would only agree to pay above market norms for these services if there were at least corresponding benefits to having done so.

6.34 The resulting assessment of Notional Infraco central costs in RP1 is some £243m below Tube Lines' actual costs. Around two thirds of this difference is explained by RP1 overheads costs being based on Tube Lines' view of these costs at the start of RP2, which are of a substantially lower level relative to RP1 actual costs, and the Arbiter having reduced these costs further by removing double counting. Most of the remainder of this difference is accounted for by the Arbiter having recalculated secondment fees relative to Notional Infraco asset costs.

Overall assessment of RP1 costs

6.35 The results of the analysis described above are compared below to two other sources of information for RP1: Tube Lines' RP1 Data Breakdown Structure (DBS) submission as provided to the Arbiter on 17 November 2009 and the Baseline for Net Adverse Effects (BNAE) which is the contract price agreed by Tube Lines and London Underground at Transfer.

6.36 Tube Lines' actual costs are sourced from the DBS provided as part of the representations made to the Arbiter on 17 November. In reviewing these comparisons it should be noted that the costs for the period from April 2009 to end of June 2010 reflect Tube Lines projections for the remainder of RP1 rather than its actual costs.

6.37 Although the contract permits updating the BNAE from that as agreed at Transfer, there have not been any formal amendments by the Parties during RP1. Adjustments have therefore been made by the Arbiter for the purposes of the comparison below.

Table 6.3: RP1 base costs – Tube Lines' submission and Arbiter's assessment compared with the Baseline for Net Adverse Effects (BNAE)

Asset Area	Tube Lines' submission	Arbiter's assessment	BNAE
	£m February 2008 Prices		
Rolling stock capex	171	197	215
Rolling stock opex	678	668	719
Signalling capex	772	473	611
Signalling opex	164	202	178
Depots	28	16	30
Track & civils capex	22	0	0
Trains and Line upgrades	**1,836**	**1,555**	**1,753**
Premises & systems capex	829	887	457
Premises & systems opex	307	305	241
Lifts and Escalators capex	130	112	207
Lifts and Escalators opex	110	97	103
Stations	**1,375**	**1,401**	**1,008**
Track capex	282	309	303
Track opex	236	263	191
Civils capex	46	56	94
Civils opex	52	58	114
Infrastructure	**616**	**686**	**702**
Variations, Transition and Special Projects	**464**	**464**	**464**
Total asset costs	**4,291**	**4,106**	**3,926**
Central costs	**1,253**	**1,009**	**1,094**
Other cash adjustments[34]	**211**	**211**	**368**
Total base costs	**5,755**	**5,327**	**5,388**

Source: Arbiter's cost model and the JNP Infraco Baseline for Net Adverse Effects at Transfer.

[34] The BNAE includes an amount for 'other cash adjustments' of £368m. Tube Lines has indicated that £157m (February 2008 prices) of this amount represents risk, which is included, in its DBS, within actual costs. The Arbiter has assumed that this amount is included also within his own cost estimates for the purpose of comparing his costs to the BNAE.

6.38 Although there are differences at asset group level between the Notional Infraco and Tube Lines' figures, total asset costs in RP1 are generally similar, the key exception being in relation to the signalling upgrade costs.

Performance revenues of the Notional Infraco in RP1

6.39 In considering whether there are Net Adverse Effects in excess of the (inflated) Materiality Threshold of £236m to be remunerated at the Periodic Review, an assessment also has to be made of Notional Infraco revenues, in particular performance revenues. Notional Infraco performance has been assessed by considering the impact of its strategies, in particular to the extent they differ from those actually adopted by Tube Lines. On this basis, assumed Notional Infraco performance revenue in RP1 is close to that of the actual Infraco in most areas of the performance regime. It is however assumed that the Notional Infraco would deliver the Jubilee Line upgrade by the Latest Implementation Date of 31 December 2009 and would therefore receive revenues of £15m for the additional Capability achieved in the period January to June 2010.

6.40 The Notional Infraco is assumed to have abatements on Availability, in part to reflect the adverse effect on performance of the Jubilee Line upgrade. The Notional Infraco would, however; have achieved the same levels of Availability performance on the two Alstom maintained train fleets (Northern and Jubilee), rather than have worse performance on the Northern Line, as was the case for Tube Lines. Revenues are summarised in table 6.4 below.

Table 6.4: Arbiter's assessment of revenues in RP1

Revenue type	£m Feb 2008 Prices
Performance revenue	
Capability	(46)
Availability	3
Ambience	(5)
Service Points	28
Total	**(20)**

Source: Arbiter's cost model. N.B. Revenues are negative numbers hence positive numbers are abatements.

6.41 In addition to ISC payments from London Underground, including performance revenues, the Notional Infraco is assumed to have other sources of funds. Like Tube Lines itself, it is assumed to undertake variations at the request of London Underground and make a margin for doing so. In addition there are a number of smaller business units within Tube Lines such as Transplant (the provider of plant and equipment services on the underground network) that generate revenues. However, these are all small and are not calculated for the Notional Infraco.

The influence of London Underground on Notional Infraco costs and revenues

6.42 The analysis described above excludes possible income from claims. The PPP Agreement has a claims mechanism that is covered by the contractual Dispute Resolution Agreement (DRA), and is separate from both the Extraordinary Review and Periodic Review processes. In essence, the Extraordinary Review process is designed to deal with changes in costs of delivering contractual obligations; the claims mechanism covers additional costs incurred as a result of the client not operating in accordance with the contract.

6.43 As explained above, the PPP Agreement envisages that the Notional Infraco faces a client which operates in accordance with the principles of partnership set out in the contract. On this basis, it would not be appropriate to include in Notional Infraco costs allowances for client behaviour which could be the subject of contractual claims. By contrast, costs involved in operating the contract (such as client liaison) are clearly part of Notional Infraco costs.

6.44 The Arbiter sought representations from the Parties on the extent to which London Underground's behaviour as a client should be reflected in his assessment of Notional Infraco costs and revenues. Tube Lines argued that London Underground's behaviour had increased its costs and that the impact extended beyond what might be recoverable through claims. London Underground, in contrast, argued that some of the issues identified by Tube Lines could have been addressed under the contract by a Notional Infraco.

6.45 The Arbiter has not been persuaded that he should make a specific allowance in Notional Infraco costs, in either RP1 or RP2, to reflect the behaviour of London Underground as client under the contract. That is not to say that its behaviour has not in some cases added to costs. For example, in the early years of the contract there were significant contract management issues between London Underground and all the Infracos. These were particularly apparent in stations where there were protracted discussions on scope and management arrangements. Rather, the Arbiter considers that these are matters which are properly the subject of claims.

6.46 The Arbiter notes that Tube Lines has made claims against London Underground totalling £727m during the course of RP1 and £515m are currently pending resolution. This figure includes claims in respect of stations and additional costs and delays on the Jubilee Line upgrade, To the extent that these claims, particularly that in relation to the introduction of TBTC, are upheld, the Arbiter recognises that there are implications for the cost and phasing of RP2 work programmes. He has consulted the Parties on whether there might be contract changes to exclude such impacts from the scope of possible claims in RP2, allowing for them instead in Notional Infraco costs and possible future Extraordinary Reviews, and was told that the Parties did not support such changes. Accordingly, he has based his cost projections on the assumption that the Notional Infraco would, like Tube Lines itself, make

claims for additional costs arising from behaviour by London Underground which is not in accordance with the terms of the PPP Agreement.

Establishing the RP1 closing position

6.47 The reference question asks the Arbiter to include in his direction a statement of the RP1 closing position. Following discussions with the Parties it was agreed in principle that the Notional Infraco was unlikely to have a significant cash balance at the end of RP1 since any material funds are potentially eligible for payment to shareholders as dividends.

6.48 However to confirm this assumption, and in particular to confirm that there are no Net Adverse Effects in excess of the Materiality Threshold to be remunerated at the Periodic Review, the Arbiter has assessed likely Notional Infraco costs and revenues, excluding claims.

6.49 Notional Infraco costs at the end of RP1 are under the revised baseline by £60m. Other revenues increase this amount which means that the Notional Infraco would not have grounds for an Extraordinary Review as its net cost increase does not exceed the Materiality threshold set by the PPP Agreement.

6.50 The Arbiter therefore considers the Notional Infraco does not have a material cash balance at the end of RP1 as a result the opening cash position of the Notional Infraco is assumed to be nil.

7. Notional Infraco costs in RP2

7.1 This chapter:

- considers the implications of the RP1 assumptions on RP2 costs and revenues;
- provides the analysis of costs on an asset by asset basis and for central costs;
- discusses overlays of cost for risk, efficiency and differential inflation;
- provides revenue assumptions and resultant revenues for the Notional Infraco;
- provides a comparison of this analysis to the Arbiter's projections in initial ranges;
- discusses the impact of London Underground as client on RP2 costs and revenues; and
- provides the summary of costs and revenues that underpins the draft directions.

Implications of RP1 assumptions on RP2 costs

7.2 The Notional Infraco strategy described in chapter 6 reflects the requirements of Schedule 3.1 of the PPP Agreement to manage assets on a whole life basis. In other words, the Notional Infraco does not constrain its planning to a $7^1/_2$ year horizon and plans on a whole life basis irrespective of when in the contract period an investment decision has to be made. These strategies are continued and developed in RP2; for example, they are amended where the Parties have provided initial paragraph 6.5 guidance and this has been reflected in a contract change.

7.3 Where paragraph 6.5 guidance has been provided but contract changes are not proposed or are not yet in place, a view has been taken as to whether this guidance would be adopted by the Notional Infraco given the strategy that it adopted in RP1. In part this decision is informed by the amount of progress made by the Parties towards agreement. For instance, it is expected that the Parties will agree revised benchmarks for track condition and so the work that they have undertaken so far is used as the basis of Notional Infraco pricing. For escalators, however, the Parties have worked together to define an agreed approach but significant differences of view remained until very recently. In this instance, the Arbiter's analysis is based on the assumption that the Notional Infraco maintains its RP1 strategy[35].

7.4 In RP1, the Notional Infraco is assumed to achieve significant catch up efficiencies. The impact of this is that it enters RP2 with lower costs

[35] The Arbiter will review this, to take into account the revised paragraph 6.5, in his final direction.

than the actual Infraco, for example in relation to trains systems which covers rolling stock and signalling opex, where Notional Infraco costs are assumed to have moved towards (but not reached) the good practice levels suggested by international benchmarking. The work programme for RP2 is then generally priced with limited allowance for further catch up. Frontier shift efficiency is however applied as a separate overlay.

7.5 The Notional Infraco is also assumed to have delivered a higher volume of output in RP1 in certain areas, most notably for the Jubilee and Northern Line signalling upgrade projects, than Tube Lines has actually delivered.

Asset area analysis

(a) Line upgrades

7.6 The Parties position on Line upgrades is discussed in chapter 6 and their views on the work programme and costs for RP1 are similarly divergent.

7.7 The Infraco obligations in RP2 include completion of the Northern line upgrade project by 7 January 2012 and the Piccadilly Line upgrade project in two phases with phase 1 complete by 11 October 2014 and phase 2 complete by 10 October 2015. Phase 1 covers the majority of the line from Cockfosters to South Ealing and South Harrow, phase 2 extends the system to the Heathrow loop and Rayners Lane. There is also an option for London Underground to require Tube Lines to extend the signalling system to cover Rayners Lane to Uxbridge. Since it is an option that has not yet been exercised it is not included in the Arbiter's costs.

7.8 In relation to the trains element of the Piccadilly Line upgrade project the Parties have agreed that the fleet will be leased and the expected terms of the lease have been provided to the Arbiter in outline as part of a draft 6.6 agreement that the Parties intend to sign once the competition for the rolling stock contract is complete. Tube Lines is currently negotiating with two prospective train providers for the Piccadilly Line. Given the clear intent of the Parties to lease this fleet, the Arbiter has adopted the lease payment profile provided by the Parties as the costs of the Notional Infraco. These costs are captured with rolling stock opex which is discussed further below.

7.9 As discussed in section 6, the Northern Line upgrade project would follow a similar schedule to the Jubilee Line and it would be delivered by 7 January 2012, with 72% of the work completed in RP1. The remaining costs are included in the Arbiter's costs for RP2.

7.10 The Arbiter considers that the strategy for the Piccadilly Line upgrade project will be more efficient than that achieved for the Jubilee Line upgrade and Northern Line upgrade projects. To establish the efficient level of costs for the Piccadilly Line upgrade project, the Arbiter has again considered costs of signalling upgrade projects internationally. Because the Notional Infraco has gained experience from the Jubilee

and Northern Line upgrade projects and has kept abreast of international developments, the Arbiter considers that the Notional Infraco will avoid some of the development costs that have been experienced on some of the other projects.

7.11 The level of costs achieved by other metros provides the basis for pricing the Notional Infraco before taking into account factors that are peculiar to the Piccadilly Line. The Arbiter considers that the costs for the future Piccadilly Line upgrade project should be broadly in line with historic outcomes at good practice metros and has derived his cost forecast from the costs of the lowest five brown field projects in the data set. The Arbiter has allowed additional on-costs, including 10% for project establishment costs, 15% for project management costs and 30% to allow for factors specific to the Piccadilly Line. The Arbiter has also included enabling works that he considers to be appropriate to the Piccadilly Line upgrade project.

7.12 Commissioning testing and approval for Piccadilly Line upgrade phase 1 would be completed by October 2014. This would be followed by commissioning and testing for Piccadilly Line upgrade phase 2, which would be completed by October 2015. Minor track speed improvement works would also be implemented during this time but would not be on the critical path.

7.13 The Notional Infraco's costs in RP2 for the Northern and Piccadilly Line signalling upgrade projects are shown in the following table together with the Parties' estimates, and illustrated in Figure 7.1.

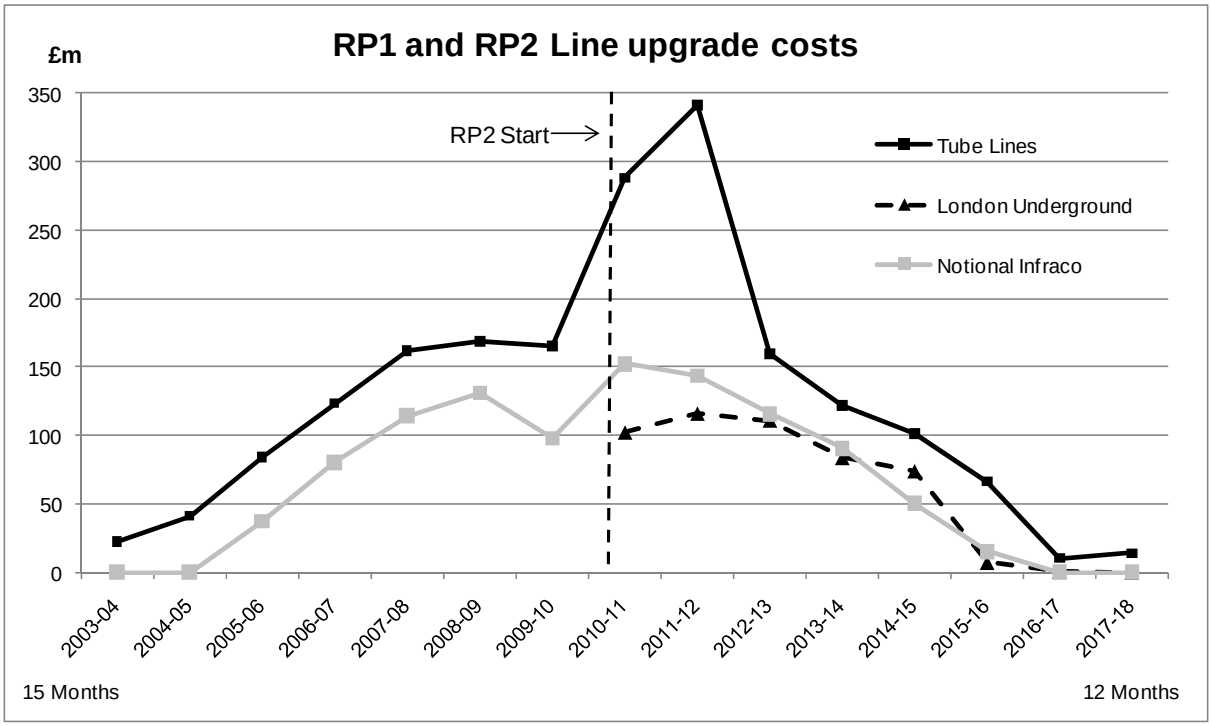
Table 7.1: RP2 line upgrade costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Prices		
Rolling stock	68	34	3
Signalling	832	386	532
Depots	46	17	0
Track & civils upgrades	121	39	0
Total capex	**1,000**	**418**	**535**
Line upgrades total	**1,068**	**476**	**535**[36]

Source: Arbiter's cost model

[36] In the Arbiter's analysis line upgrade depot costs are accounted for as part of rolling stock and depots.

Figure 7.1



(b) Non-upgrade signalling costs

7.14 Following the upgrades a modest amount of capital expenditure is required for mid-life signalling equipment refurbishment. London Underground proposed costs of £25.3m in RP2 and Tube Lines proposed costs of £10.6m. The Notional Infraco has adopted Tube Lines' forecasts in RP2, as Halcrow considers that Tube Lines will have better understanding of the costs.

7.15 Signalling opex costs reflect the costs of maintaining the signalling systems and mainly cover staff costs and spare parts. Staff costs include routine maintenance, routine inspection and rapid response teams located at a number of depots which respond quickly to faults in order to reduce performance abatements to an efficient level. The initial paragraph 6.5 guidance proposes that inspection frequencies are reduced, which reduces costs in RP2. This is consistent with the Notional Infraco continuing to reduce costs towards the levels achieved by an Infraco applying Good Industry Practice but does not result in a further reduction to the Notional Infraco's costs as these costs are based on efficient practices.

7.16 London Underground agrees with the use of international benchmarks to assess opex costs but considers that benchmark data should be inflated to reflect London labour rates.

7.17 Tube Lines considers that its bottom-up estimates of maintenance based on historic RP1 costs is appropriate and argues for a larger response team than is proposed for the Notional Infraco and that ten maintenance depots are needed to provide service levels consistent with the performance regime.

7.18 The Notional Infraco strategy is to continue with the maintenance strategy adopted for RP1. The Notional Infraco assumes that the Jubilee Line upgrade is complete by the beginning of RP2 and that removal of redundant equipment would begin within six months of commissioning the TBTC signalling. In this period the Notional Infraco incurs additional maintenance costs because it will maintain both systems for six months after the upgrade.

7.19 The Notional Infraco would seek to improve the flexibility of the workforce e.g. by using staff on all lines rather than on one and would revise inspection frequencies in line with Good Industry Practice as evidenced by international benchmarking.

7.20 Pricing is based on independent models for maintenance of the existing signalling systems, with costs reducing by 3% per annum towards Good Industry Practice levels as evidenced by benchmarking. Post upgrade the Notional Infraco reduces maintenance costs by a further 4% bringing costs into line with Good Industry Practice levels by the end of RP2.

Table 7.2: RP2 non upgrade signalling costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Prices		
Signalling & control capex	11	33	11
Signalling & control opex	183	126	173
Signalling & control total	**194**	**159**	**183**

Source: Arbiter's cost model

(c) Train Systems

7.21 Rolling stock capex in RP2 is primarily comprised of a mid life refurbishment of the Jubilee and Northern line fleets which are both scheduled for completion in May 2017.

7.22 As part of their negotiations, the Parties have agreed both the scope of work and a maximum cost for each of these refurbishments. This has been notified to the Arbiter as part of the Parties' initial paragraph 6.5 guidance.

7.23 The Notional Infraco analysis adopts this scope but the work is priced independently of the Parties' estimates. The average costs per car is estimated to be £74k for the Jubilee lines and £64k for the Northern line giving fleet totals of £33m and £41m respectively. These amounts are in line with the Parties agreed maximum amounts.

7.24 Rolling stock opex is the largest category of cost within the DBS covering maintenance of the three fleets from cleaning to heavy overhaul and the lease costs of the Northern and Piccadilly Line fleets.

7.25 Tube Lines cost estimates for RP2 are based on its existing contracts and in house run rates adjusted for efficiencies delivered in RP1. Tube Lines has also taken account of what it regards as increased demands on the rolling stock e.g. expected increased usage and the performance impacts (abatements) that are associated with failing to meet contractually specified levels of performance.

7.26 In its informal submission, London Underground states that rolling stock maintenance is priced at a long term economic and efficient cost. This is achieved in part via the renegotiation of Tube Lines existing contracts at an appropriate point in time.

7.27 The Notional Infraco projection is based on a continuation of its RP1 strategy. In respect of maintenance, Piccadilly line costs are assumed to be in line with the good practice levels demonstrated by Tube Lines in RP1. It is assumed that the new fleet would require a similar cost allocation for maintenance although the details of the regime will depend on the rolling stock that Tube Lines finally procures. Piccadilly Line lease costs are taken from the draft 6.6. agreement. Jubilee Line maintenance costs are assumed to fall to good practice levels following the renegotiation of the maintenance contract in RP1. Northern Line costs are assumed to be unchanged in RP2 given that the current Alstom contract extends to 2017.

7.28 The RP1 strategy has however been adjusted for RP2 to take account of matters that the Parties have agreed and their initial paragraph 6.5 guidance on the usage projection and the maintenance costs associated with the Piccadilly Line as the old stock is decommissioned and the new stock introduced.

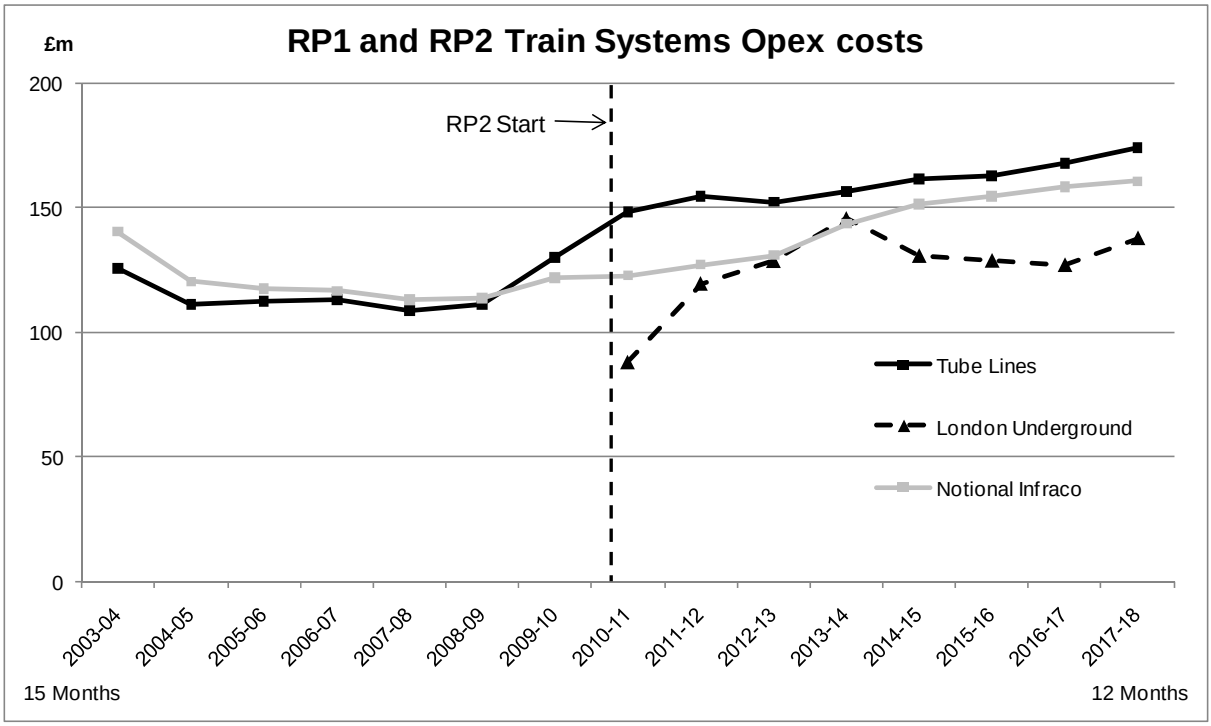
7.29 The resulting assessment of Notional Infraco costs are compared to the Parties' views in the table below, and illustrated in Figure 7.2.

Table 7.3: RP2 rolling stock costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Prices		
Rolling stock capex	81	33	74
Rolling stock opex	1,004	843	904
Rolling stock total	**1,085**	**876**	**978**

Source: Arbiter's cost model

Figure 7.2



(d) Depots

7.30 Depot works provide for optimisation of fleet maintenance generally and particular improvements to the facilitate maintenance of the new Piccadilly Line fleet. There is broad agreement between the Parties and the Notional Infraco on the scale of these costs which are provided in the table below.

Table 7.4: RP2 depot costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Prices		
Depots capex	4	13	13
Depots opex	13	3	3
Depots total	**17**	**16**	**16**

Source: Arbiter's cost model

(e) Stations premises and systems

7.31 Premises and systems work includes:

- stations enhancements comprising station refurbishments, modernisations and enhanced refurbishments;
- work on station systems such as communications and fire protection assets;

- refurbishment of station staff accommodation;
- works in relation to rail vehicle accessibility (RVAR);
- accessibility projects;
- work on non stations premises such as other operational staff accommodation e.g. train crew depots and renewal and maintenance work at over 200 locations (lineside buildings etc); and
- routine maintenance.

7.32 The RP2 capex work volume is now very significantly changed from Restated Terms and has been further amended by the initial paragraph 6.5 guidance to the Arbiter. For example originally there were to be 100 station refurbishments in RP2 his was reduced to 50 in Restated Terms and there are now just 38 projects in RP2. This change has the knock on effect that much of the work on stations systems was, in RP1, completed alongside enhancements but now must be priced and undertaken separately.

7.33 In addition, given the difficulty of defining and agreeing the scope of work for station enhancements in the early years of RP1, the Parties have now developed bills of quantity at a station level which are to be contractualised for RP2 and used as the basis of pricing. They have also agreed that there is to be work on staff accommodation at four stations and they have agreed the approach to and volume of RVAR works to platforms. All of this is captured in the initial paragraph 6.5 guidance provided to the Arbiter.

7.34 The Parties do not agree, however, on the volume of systems work required to be undertaken nor do they have a shared view of the scope in relation to non stations premises. In relation to stations systems there is a disagreement as to how much work would have been undertaken in RP1 and therefore what need to be done in RP2. In relation to premises there is a disagreement as to how much of this work is already accounted for by the routine maintenance cycle.

7.35 The Notional Infraco analysis adopts the agreements of the Parties but the agreed scope is priced on an independent basis. Specialist advice has been sought on pricing for components of the refurbishment work taking into account the location (sub-surface or deep tube) and for on costs.

7.36 In relation to stations systems it is expected that the Notional Infraco would continue its whole life approach but that this would be more significantly influenced by the asset condition benchmark requirements at the end of RP3 given the reduction in the level of station enhancements. Work volumes are based on the asset condition assessment at the end of RP1 and focus on removal of D and E condition. In addition 50% of communications assets are replaced given their short lives.

7.37 London Underground presents data for non-stations premises costs based on Tube Lines' asset condition assessment and their estimate has been adopted for the Notional Infraco as Tube Lines does not provide details of scope or costs for these assets.

7.38 In relation to maintenance the strategy remains unchanged from RP1 and continues to use the maintenance model developed for the first contract period although changes have been made to reflect representations e.g. to allow for the London Living Wage and relevant initial paragraph 6.5 guidance e.g. in relation to the Ambience regime and its impact on cleaning costs.

7.39 The Parties have been discussing the approach to lifts and escalators in RP2 for some time but they were unable to reach an agreed a position until very recently. Updated paragraph 6.5 guidance was provided on 11 December, and will be taken into account in the Arbiter's final direction.

7.40 Tube Lines' approach was previously described as a continuation of its RP1 strategy which, for escalators, is based on a series of interventions that effectively replace key components but which leave the existing escalator truss in place. Tube Lines points to its significant success in reducing the time taken to refurbish an escalator on this basis and to the improved asset condition delivered in RP1 to support continuation of its approach.

7.41 In contrast, London Underground proposed, based on recent benchmarking work through CoMET, that the Infraco should move to a strategy of replacement. This, it regards, is a material change to the existing approach in London and formal adoption of this strategy will follow a trial of heavy duty compact escalators at a small number of sites. In RP2 London Underground now proposes to remove all 'in truss replacements' and carry out specified interventions instead. London Underground assumes that installation of compact escalators will commence from the start of RP3. London Underground also refers to 14 'machine-room-less escalators'. These have not been priced as it is not clear whether they are part of the RP2 obligations or are expected variations.

7.42 The Parties had provided initial paragraph 6.5 guidance in two areas. The first allows a 6 hour window for nightly engineering access at stations and the second extends the notional asset lives of the Jubilee Line extension escalators from 25 to 40 years, in line with other escalators on the underground network, and extends the major intervention cycle to 14 years.

7.43 As the Parties had not agreed on the work scope for RP2, Notional Infraco pricing is based on a continuation of the strategy developed in RP1. This assumes that modern standard escalators will be deployed since their use is proven elsewhere. This continues the cost and access savings already assumed for RP1. The Notional Infraco strategy does however adopt the initial paragraph 6.5 guidance discussed above.

7.44 In the case of lifts, Tube Lines states that it and London Underground have generally agreed the strategy, interventions and work scope and have agreed pricing in certain areas although this is not immediately apparent from their DBS.

7.45 The lift strategy for the Notional Infraco follows RP1 but considers lifts and escalators in the round. Work on escalators is prioritised where, based on condition, there is a choice since this is considered to have the better whole life impact. This prioritisation of escalator works is a key difference between the Notional Infraco and the Parties RP2 estimates.

7.46 A comparison of the Notional Infraco projections with those from the Parties is provided in the table below.

Table 7.5: RP2 stations costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Prices		
Premises & systems capex	366	181	273
Premises & systems opex	338	315	269
Premises & systems total	**704**	**496**	**542**
Lifts capex	78	55	19
Lifts opex	34	22	18
Lifts total	**111**	**77**	**37**
Escalators capex	158	91	115
Escalators opex	95	63	75
Escalators total	**253**	**154**	**189**
Stations total	**1068**	**728**	**768**

Source: Arbiter's cost model

(f) Track

7.47 The Parties have been working together to develop a joint scope of capex work for RP2 and are now broadly agreed. To give effect to this change they will amend the asset condition benchmarks that are set in the PPP Agreement. In relation to opex the Parties acknowledge that an effect of their initial paragraph 6.5 guidance is an increase to opex costs.

7.48 Given the Parties' clear agreement to adopt this capital programme, the Arbiter's analysis assumes the same scope although it is priced

independently. A corresponding increase in the opex programme has not been allowed as this is an area where catch up efficiencies continue into RP2 given how far off the benchmarking range both the actual and Notional Infraco remain at the beginning of RP2.

7.49 The cost comparison is provided below.

Table 7.6: RP2 track costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Prices		
Track capex	390	227	269
Track opex	250	288	227
Track total	**640**	**515**	**496**

Source: Arbiter's cost model

(g) Civils

7.50 The civils asset group comprises:

- Bridges and structures;
- Deep tube tunnels;
- Earthwork structures; and
- Pumps and drainage.

7.51 The obligations on Infraco are primarily driven by condition benchmarks rather than the performance regime however, the Parties have been working jointly on the scope of works to be undertaken to the civils asset group and have issued several papers as part of their initial paragraph 6.5 guidance to the Arbiter.

7.52 Although work scope has been clarified and the Parties have moved closer together, their approaches to pricing are different. Given the diversity of the civils asset group London Underground adopts a modelled approach. Tube Lines assesses requirements based on a bottom up approach that considers the gap between current and required condition.

7.53 The Notional Infraco approach is to roll forward the top down RP1 strategy which is based on meeting the relevant condition benchmarks but the changes set out by the Parties in the initial paragraph 6.5 guidance have been adopted. Unit costs are independently assessed based on engineering judgement.

7.54 In relation to maintenance costs the RP1 model, which is based on resource levels required to carry out the programme of preventative and reactive maintenance and inspections, is also retained as the start point for RP2. However, given that the Infraco has accumulated significant knowledge of the condition of its assets, including grey

assets, in RP1 it is assumed that that it could move to a risk based inspection regime in RP2. This is expected to reduce costs by roundly 3% per annum over the course of the second review period.

Table 7.7: RP2 civils costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Prices		
Civils capex	116	87	113
Civils opex	78	102	73
Other Core PPP costs	41	0	0
Civils total	**235**	**189**	**186**

Source: Arbiter's cost model

7.55 A notional amount of £35m is included in track for power. This is based on a average of the Parties' views of the costs in this area.

(h) Central costs

7.56 Both Tube Lines' and London Underground's estimates of central costs reflect all relevant scope changes, relative to Restated Terms, which have been agreed between the Parties in their initial paragraph 6.5 guidance to the Arbiter.

7.57 Tube Lines' central cost estimates have been developed from the bottom up using activity based cost analysis in respect of each of its main central cost functions. In its Response to Restated Terms, Tube Lines indicated that it could achieve additional efficiency savings relative to its bottom-up cost estimates of the order of £200m as a result of structural changes to its organisation. As part of the subsequent clarification process with London Underground, Tube Lines specified how it proposed to allocate these cost savings across the central costs categories and these assumptions have been factored into all Tube Lines' RP2 central cost estimates referenced in this document.

7.58 London Underground's central cost estimates have been developed by drawing upon a range of evidence including FTE information provided in Tube Lines' AAMP, the Arbiter's Initial Ranges guidance, external benchmarking data and information on the central costs of the former Metronet companies. This information has been used to develop bottom-up costings where possible although in places, for example in respect of overheads costs, it has had to rely on top down cost estimates.

7.59 In reaching his own view on the level of the Notional Infraco's central costs, the Arbiter has developed an 'in the round' estimate which draws on an analysis of central costs which, consistent with the Arbiter's

Analytical Approach document, considers a range of information and evidence including:

- expert judgement (sourced from the Hackett Group in respect of IT costs and Actium Consulting in respect of accommodation costs);
- technical advice (sourced from other of the Arbiter's advisers i.e. Halcrow and Serco);
- other regulators' data (provided to the Arbiter in confidence by ORR and Ofgem);
- other external benchmarking information (including both costs and revenue based benchmarks); and
- trend analysis (in the absence of alternative sufficient robust external reference points).

7.60 The Arbiter has not developed 'strategy' for central costs in the same way as for asset costs because he considers central costs to be less sensitive to the overall Notional Infraco strategy than asset costs. Instead, his estimates of central costs are largely determined with reference to external benchmarks. The estimate for RP1, described in chapter 6 above, generally adopts the same benchmarks used to develop the RP2 assessment.

A&O costs

7.61 The Arbiter's view of A&O costs (including IT capex) for the Notional Infraco, over the whole of the second Review Period, is £410m as shown in table 7.8 below. Tube Lines' equivalent estimate is £403m, while London Underground's is £344m.

7.62 Although the Arbiter's overall view of central costs sits between the Parties' equivalent estimates, for several of the A&O cost categories, such as Planning, Management and Regulatory, the Arbiter's estimates are above both Tube Lines' and London Underground's estimates. In such cases, the Arbiter considers that the Parties' own estimates are of a level which is below that which a Notional Infraco could be expected to achieve. However, there are other areas, such as legal costs, for which the Arbiter considers both Parties' estimates to be in excess of the Notional Infraco estimate.

7.63 Some cost categories were considered together in reaching these estimates. The main example of this is the joint consideration of IT, finance, procurement and HR costs, where the Arbiter's estimates are based on benchmarks sourced from the Hackett group, which assume that spending in one area will result in the achievement of cost savings in other areas. Therefore, it is the sum of these cost categories that can most usefully be considered and compared, rather than the cost of individual components.

7.64 As set out in the table below, in the absence of relevant external benchmarks, the Arbiter's estimate of 'Other' costs has been developed using Tube Lines' view of these costs as the starting point. However, the £60m allowance for pensions costs included in Tube Lines'

estimate has been removed and substituted with an amount for the Notional Infraco of £73m, the derivation of which is described in chapter 9 of this document.

7.65 The 'Exceptionals' line, for the Notional Infraco, reflects simply those costs in respect of the preparing for the next Periodic Review. Tube Lines includes £21m of these costs but the Arbiter considers that the Notional Infraco would require no more than £10m. The Arbiter has not made an allowance for the current Periodic Review, on the grounds that these costs are properly incurred in RP1 (although costs to prepare for the next Periodic Review are included towards the end of RP2).

Table 7.8: RP2 A&O costs – Parties' submissions and Arbiter's assessment

	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 prices		
Planning, Management and Regulatory	25	19	29
Accommodation and Facilities (excl. Investment)	61	60	65
Accounting and Finance	24	24	29
Commercial	11	7	12
Human Resources	18	22	21
Safety, Health and Environment	15	19	19
IT/MIS Support (Including IT investment)	124	84	78
Procurement	0	18	38
Legal Services	11	10	4
Communications	8	7	8
Other costs	86	75	97
Exceptionals	21	0	10
Total	**403**	**344**	**410**

Source: Arbiter's cost model

Operational and capital overheads

7.66 The Arbiter's view of total overheads costs for the Notional Infraco, over the whole of the second Review Period, is £151m as shown below. This compares with Tube Lines' £217m cost estimate and London Underground's £113m estimate.

7.67 As acknowledged by London Underground in its informal submission, it is difficult to estimate overheads costs in the same way as many of the A&O cost categories because of the absence of relevant external benchmarks. Therefore, the approach which the Arbiter has adopted to estimating these costs is one which uses Tube Lines' estimates of £130m of operational overheads costs and £88m of capital overheads costs as the starting point of his own estimates and adjusting these according to his own judgement.

7.68 The first set of adjustments which the Arbiter has applied to Tube Lines' estimates is the removal of those aspects of these costs which he considers to be captured already in his A&O estimates. The Arbiter has removed £10m of procurement costs and £6m of Safety, Health and Environment costs from operational overheads and £9m of procurement costs and £3m of Safety, Health and Environment costs from capital overheads.

7.69 The second set of adjustments made reflect the Arbiter's view that there is double counting of project management costs. For the Notional Infraco £20m has been removed from the costs included in Tube Lines estimate for the operations head office from operational overheads and £20m from the management costs which Tube Lines has included in its capital overheads estimate. The sum of the Arbiter's adjustments result in an operational overheads estimate of £95m and a capital overheads estimate of £56m as shown in the table below.

7.70 The Arbiter notes that the DBS requires that an amount be added to capital overheads costs in respect of minor and major closure bookings. However, as indicated in chapter 11 the Arbiter considers that the allowances should be set at the level in his guidance so no adjustment to cost is necessary.

Table 7.9: RP2 overheads costs – Parties' submissions and Arbiter's assessment

	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 prices		
Operational overheads	130	68	95
Capital overheads	88	46	56
Total	**217**	**113**	**151**

Source: Arbiter's cost model

Other separately identified costs

7.71 As described in chapter 6, separately identified costs are largely those costs which reflect either payments to shareholders or contractually specified amounts. The Arbiter's view of the total level of these costs in RP2 is £220m. The corresponding cost estimate put forward by Tube Lines is £260m, while London Underground's view is £205m.

7.72 Scarce Resources revenues and costs are based on averaged revenues and costs as provided by the Parties for RP2 and RP3.

7.73 The Arbiter's approach to the calculation of secondment fees is consistent with that adopted in respect of RP1 costs and as described in section 6 above.

7.74 In respect of Minor Works, which are in effect small variations pre-funded by London Underground, the Parties have been discussing the financial provision to be made by Infraco, its make-up and relationship with a new category of variation being the Customer Information Change provision. Initial paragraph 6.5 guidance has been provided on this subject but it is noted that despite apparent agreement on this matter the Parties allow differing amounts in their respective DBSs.

7.75 The Arbiter has therefore assumed that the proposal made by the Parties in the initial paragraph 6.5 guidance reflects what they are seeking to achieve and has made a Minor Works allowance of £4.43m per contract year and an allowance for Customer Information Changes of £763k per contract year. It is noted that the initial paragraph 6.5 guidance rolls into these allowances a number of other small items such as stations signage and building exploitation costs. The Arbiter' analysis of these costs is not completed at such a granular level.

7.76 PFI enabling works is a small category of cost and Tube Lines figures are adopted by the Arbiter as they have not been separately analysed. The same approach is adopted for building costs.

Table 7.10: RP2 separately identified costs – Parties' submissions and Arbiter's assessment

	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 prices		
Scarce Resources - Net opex	(35)	(45)	(35)
Secondment Agreements Fees	228	196	195
Minor Works	39	34	39
PFI Enabling Works	3	0	3
Scarce Resources Plant and Machinery capex	25	20	17
Buildings	1	0	1
Total	**260**	**205**	**220**

Source: Arbiter's cost model

7.77 The Arbiter's total central cost estimate for the Notional Infraco, over the whole of the second Review Period, is £782m as shown below.

Table 7.11: RP2 central costs – Parties' submissions and Arbiter's assessment

	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 prices		
A&O	403	344	410
Operational overheads	130	68	95
Capital overheads	88	46	56
Other separately identified costs	260	205	220
Total	**881**	**661**	**782**

Source: Arbiter's cost model

Total base costs

7.78 The Arbiter's assessment of total base costs for RP2 (i.e. asset costs and central costs, before overlays for efficiency, differential inflation and risk) are as set out in the table below.

Table 7.12: Total RP2 base costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Prices		
Rolling stock	68	34	3
Signalling	832	386	532
Depots	46	17	0
Track & civils	121	39	0
Line upgrades	**1,068**	**476**	**535**
Rolling stock	1,085	876	978
Signalling & control	194	159	183
Depots	17	16	16
Trains	**1,296**	**1,052**	**1,177**
Premises & systems	704	496	542
Lifts	111	77	37
Escalators	253	154	189
Stations	**1,068**	**728**	**768**
Track	640	515	496
Civils	235	189	186
Infrastructure	**876**	**703**	**681**
Total asset costs	**4,308**	**2,959**	**3,162**
Central costs	881	661	782
Total base costs	**5,189**	**3,621**	**3,943**

Source: Arbiter's cost model

Overlays for efficiency, differential inflation and risk

7.79 Overlays of base costs are made for frontier shift efficiencies, differential inflation and risk. These are discussed in turn the section below.

(a) Efficiencies

7.80 The starting point assumption for calculating base costs is that most available catch-up would have been achieved by the start of RP2; in other words costs at the start of RP2 are consistent with those of a Notional Infraco is generally positioned on the Good Industry Practice (GIP) frontier. Therefore, from the start of RP2, allowance need only be made for further productivity improvements which reflect the outwards shift of that frontier.

7.81 While in a typical regulated industry, a blanket efficiency overlay would be applied to base costs, the adjustment for the Notional Infraco needs to take account of competitively tendered upgrade projects and other large contracts, which have their own payment milestones set over a fixed time horizon and which incorporate future efficiency, where these contracts are a fair reflection of the market. Therefore, in order to avoid any double counting the Arbiter has had to consider not only the quantum and timing of the frontier shift but also how this should be applied considering, in particular, whether there are costs to which efficiencies should not be applied.

7.82 The Parties' projections of the potential for efficiency savings over the whole of the second Review Period are set out in below. Both Tube Lines' and London Underground's estimates reflect all changes to base costs which have been made as a result of the scope changes agreed between the Parties under paragraph 6.5.

7.83 Consistent with the Arbiter's assumed starting point in estimating efficiencies, Tube Lines has developed its own estimate assuming that the relevant concept for projecting efficiencies for the Notional Infraco is frontier shift efficiency only. The overall annual rate of frontier shift efficiency improvements, on which Tube Lines has based its efficiency amount has been derived from an analysis carried out by its economic adviser, who developed composite Total Factor Productivity (TFP) estimates, using evidence from the EUKLEMS[37] database.

7.84 However, the percentage which Tube Lines has applied in calculating the amount shown above is somewhat lower than the calculated composite indices would imply because Tube Lines contends that its achievement of these efficiencies is constrained by the PPP environment and by the nature of the PPP contract. While it recognises the difficulty of quantifying such effects, Tube Lines has chosen to apply two thirds of the projects and maintenance TFP estimates developed by its economic adviser.

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[37] A database on measures of economic growth, productivity, employment creation, capital formation and technological change at the industry level for all European Union member states from 1970 onwards.

7.85 London Underground's efficiencies estimate reflects a top-down approach which it has established by applying its judgement as to the level of efficiencies which it considers a Notional Infraco could achieve in the second Review Period. London Underground's judgement has been informed by:

- the potential frontier shift efficiency savings identified by its economic adviser (although London Underground chooses to 'aim off' from these potential savings for reasons described below); and
- the quantum of efficiency savings which London Underground considers to be captured already in its estimates of base costs, which it has developed on a bottom-up basis.

7.86 London Underground considers that the level of efficiencies captured already in asset costs to be of the order of £106m. Therefore, London Underground's efficiencies estimate on a comparable basis to Tube Lines' estimate, is £144m i.e. £106m plus £38m. Hence the full scope of the efficiency saving identified by its economic adviser is not included given the basis on which base costs have been assessed.

7.87 In reaching his own view on the level of Notional Infraco frontier shift efficiency, the Arbiter has considered both the likely rate of annual frontier shift in respect of each of central, capital and operating costs and the way in which these estimates should be applied to base costs. In considering these questions, the Arbiter has sought to consider a full range of evidence, while relying most heavily on those pieces of information considered to be the most relevant and robust. These are:

- the expert judgement of the Arbiter's economic advisers;
- composite TFP estimates developed from evidence on TFP growth achieved by industries that perform similar functions to the Notional Infraco (sourced from the EUKLEMS database); and
- a survey of the recent determinations of UK regulators and of the advice on which these determinations were based.

7.88 The Arbiter's view of the overall potential for frontier shift efficiency, in percentage terms is just below 1% per annum, as shown below.

Table 7.13: RP2 frontier shift – Arbiter's assessment

	Composite	Regulators	Arbiter's assessment
	Frontier shift per annum		
Central	0.7%	n/a	0.7%
Opex	0.7%	1.2%	0.9%
Capex	0.8%	1.5%	1.2%
Overall[38]	**0.7%**	**n/a**	**1.0%**

Source: CEPA report

7.89 The comparison of the Notional Infraco estimates to the Parties' respective views is in the table below. As noted above, London Underground and Tube Lines have 'aimed off' the advice provided by their respective economic advisers, NERA and First Economics. Therefore, NERA's and First Economics' advice is also shown in the table[39].

Table 7.14: RP2 frontier shift – Parties' submissions and Arbiter's assessment

	Tube Lines' submission	First Economics	London Underground's submission	NERA	Arbiter's assessment
	Frontier Shift per annum				
Central	0.1%	0.2%	0.1%	0.1%	0.7%
Opex	0.5%	0.9%	0.3%	1.3%	0.9%
Capex	0.6%	1.1%	0.2%	2.3%	1.2%
Overall*	**0.5%**	**0.8%**	**0.3%**	**1.5%**	**1.0%**

Source: CEPA report

7.90 One of the main differences between the Arbiter's view of the potential for frontier shift efficiencies and that of the Parties and their advisers is his significantly higher estimate for frontier shift in respect of central costs. This difference in view reflects the higher composite TFP index on which his estimate is based. This higher index is driven by the referencing of an alternative comparator index (which the Arbiter considers, and First Economics acknowledges, to be most reflective of the activities which the Notional Infraco carries out of those

38 The overall figures have been calculating assuming that central costs contributes 20%, opex 40% and capex 40% to central costs.

39 In order to present the efficiency percentages on a comparable basis we have had to adjust the London Underground and First Economics numbers as presented in their submissions. These adjustments are described in CEPA's December 2009 frontier shift efficiencies report.

comparators available in the database) and the use of an alternative time period (which reflects HM Treasury's view of the economic cycle).

7.91 One of the key drivers of the differences between the Arbiter's assessment of frontier shift for operating and capital costs and those of the Parties is that both London Underground and Tube Lines aimed off' their advisers' advice; as is evident from the table above, the Arbiter's estimates are close to those of First Economics' and significantly lower than those of NERA. Other important, but less significant, drivers of the differences include:

- the Arbiter having taken into account other regulator's determinations in establishing his efficiency estimates, rather than relying only on composite TFP indices as have the Parties. Evidence from the regulators tends to suggest more stretching movements in the frontier – see table 7.13 above; and
- as noted in respect of the central cost estimates, factors such as the time period used to develop the composite TFP indices and the choice of comparators used.

7.92 However, in many respects, the Arbiter's estimates have been developed in a consistent manner to the Parties' advisers' estimates. For example, the comparators used by the Arbiter recognise Tube Lines' view that its business is more construction than manufacturing based and that more weight should therefore be given to comparators selected from the construction sector. Furthermore, the estimates have been adjusted to recognise Tube Lines' view that it is not appropriate to expect frontier shift efficiencies to be achieved in respect of raw materials costs.

7.93 The Arbiter's view of the overall frontier shift efficiency savings which the Notional Infraco could achieve over the whole of the second Review Period is £143m, as shown below.

Table 7.15: RP2 efficiency allowance – Parties' submissions and Arbiter's assessment

	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 prices		
Total efficiency allowance	130	144	143

Source: Arbiter's cost model

7.94 Given the differences in the underlying percentage movements applied by the Parties to generate their efficiency amounts, the apparent consensus in the actual efficiency amounts can be attributed to:

- the differing base costs levels: Tube Lines' lower percentages are offset by its higher base costs to which these percentages are applied; and

- the way in which these efficiencies are applied to base costs: London Underground has selectively applied its efficiency percentages.

7.95 The Arbiter's approach to applying his frontier shift efficiency percentages has been to avoid a 'blanket' application. Each of the main DBS cost categories has been considered in turn and for each of these the proportion of the costs to which it would be appropriate to apply these percentages has been estimated.

7.96 In particular, the Arbiter has attempted to avoid applying efficiencies to those base costs which are included within separately negotiated sub-contracts. For example, no efficiencies have been applied to the Piccadilly line train lease costs, for which the Parties have agreed a level of fixed nominal payments.

(b) Differential inflation

7.97 Schedule 4.2 to the PPP Agreement contains an indexation mechanism which uplifts ISC only for RPIX inflation. Therefore, in order to ensure that the Notional Infraco is compensated for the full effect of input price movements, it is necessary for the Arbiter to assess the effect of differential inflation. Differential inflation is the amount by which the actual or expected cost movements differ, by either a positive or negative amount, from RPIX inflation. Inclusion of a differential allowance has the effect of uplifting costs from February 2008 prices to February 2008 real terms.

7.98 Tube Lines has developed its own estimates of the required differential inflation allowance by drawing on analysis undertaken on its behalf by its economic adviser. This analysis has involved:

- identifying a set of input cost categories i.e. labour, materials etc. for which to estimate differential inflation;
- identifying an index or a combination of indices which are considered to be most reflective of price movements in these input cost categories;
- forecasting the identified indices according to key macroeconomic variables including forecasts of GDP growth;
- forecasting RPIX based on forecasts for the Consumer Price Index (CPI); and
- comparing RPIX forecasts to forecasts for the identified input cost categories, in order to estimate the differential inflation effect.

7.99 London Underground's differential inflation estimates relied also on analysis of input price trends carried out for it by its economic advisers. The methodology adopted by London Underground's advisers appears to be broadly similar to be that adopted by Tube Lines' advisers, although there are certain key differences such as in the choice of input cost categories and representative indices and in the approach to forecast these indices.

7.100 In reaching his view on the differential inflation allowance for the Notional Infraco, the Arbiter has also drawn on analysis of input price trends. The methodology applied in this analysis is broadly consistent with that which Tube Lines' and London Underground's advisers' have adopted. However, the input cost categories and underlying indices selected differ from both those selected by Tube Lines and London Underground and there are some differences in his forecasting approach.

7.101 The Arbiter's view of the average annual percentage price movements, relative to RPIX, for the set of input cost categories which he has identified, over the whole of the second Review Period, are shown in the table below. While the table below compares his projections to the Parties' projections, as the Parties produced forecasts for their own (differing) set of cost categories a direct comparison is not always possible.

7.102 It should be noted that the Parties' projections are stated as of Restated Terms, as subsequent Representations do not state that these positions have been amended. However, some changes to the differential inflation inputs to the Parties' DBS's have been identified in the versions provided to the Arbiter alongside Representations relative to the inputs included in those versions submitted to the Arbiter on 30 June 2009.

Table 7.16: RP2 average differential inflation projections – Parties' submissions and Arbiter's assessment

	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	Average differential inflation per annum		
Labour – general	1.6%	1.3%	1.2%
Labour – specialist	3.0%	1.2%	1.5%
Materials – iron and steel	1.5%	0.3%	-0.1%
Materials- general	1.5%	-0.8%	1.6%
Equipment – Signalling	3.4%	n/a	-2.6%
Equipment – General	n/a	-2.2%	-0.2%
Rent and rates	n/a	-2.4%	3.1%

Source: CEPA report

7.103 The Arbiter's projections, as presented in the table above, are based on the 'faster recovery' sensitivity, which is described in CEPA's

December 2009 'Review and Update of Differential Inflation' report but which has been developed based on growth trend for the UK economy assumed in the Bank of England's August 2009 inflation report[40].

7.104 As the table above shows, the Arbiter's projections for all input cost categories differ from the Parties' projections for these corresponding categories. The main drivers of the differences between the Arbiter's forecasts and the Parties' forecasts are differences in the way in which advisers have produced their forecasts and in particular the way in which they have translated information on key macroeconomic variables including unemployment, GDP and inflation into forecasts for the underlying indices.

7.105 The table above shows the average annual differential inflation projection over the second Review Period. However, differential inflation is applied from February 2008 onwards (the price base for base costs) so that the Arbiter has also had to develop forecasts for the period between now and the start of the second Review Period. The Arbiter's forecast for this period differs substantially from the Parties' forecasts in this period. For example, just under two thirds of the difference between the Arbiter's differential inflation allowance and Tube Lines' allowance can be attributed to differing opinion as to the inflation applied in the period between February 2008 and the start of the second Review Period. Given this, the Arbiter will want to consider whether it is appropriate to include a re-opener provision in his final directions to allow for the most recent indices to be adopted.

7.106 In order to apply the Arbiter's differential inflation projections, he has had to identify what proportion of each of the main cost areas is made up of the input cost categories for which he has forecast differential inflation. The Arbiter has also had to consider whether there are any cost categories to which differential inflation should not be applied.

7.107 During their clarification meetings, the Parties indicated that they had reached near consensus on the relevant input mix for each of the main cost areas. The Arbiter has adopted this assessment of the relevant input mix.

7.108 The resulting differential inflation allowances are shown below.

[40] The Bank of England's November 2009 report has become available subsequent to the analysis by the Arbiter's advisers. The effect of variability in projections is reflected in the risk allowance for differential inflation.

Table 7.17: RP2 differential inflation allowance – Parties' submissions and Arbiter's assessment

	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 prices		
Total differential inflation allowance	405	184	172

Source: Arbiter's cost model

(c) Risk

7.109 London Underground considers that the Notional Infraco is protected from risk by the existence of the Extraordinary Review provisions and argues that the Materiality Threshold should be considered when calculating risk. It also notes that the process is asymmetric and there is therefore a potential windfall gain for the Notional Infraco if outturn costs are lower than forecast.

7.110 Notwithstanding this, London Underground accepts that risk pricing would need to be sufficient to accommodate normal project finance sensitivities. Although the Notional Infraco and its lenders would take into account Extraordinary Review provisions, London Underground recognises that the process is not certain and that some risk provision over the Materiality Threshold is appropriate.

7.111 Low probability high impact events are however excluded as London Underground considers that these are more appropriately dealt with by Extraordinary Review. It also notes that the risk allowance should not include items that are insured, force majeure or recoverable through claims, except where the Notional Infraco bears some of the cost.

7.112 London Underground acknowledges that the level of differential inflation is outside of the Notional Infraco's control and may therefore be a qualifying cost for Extraordinary Review and that creating a separate mechanism for compensating the Notional Infraco for differential inflation could reduce this risk thus reducing the risk of Extraordinary Review. However, in the absence of agreement on an alternative indexation mechanism, it includes £56m for differential inflation risk.

7.113 London Underground considers that the performance regime provisions, including the risk adjusted benchmarks, remove the need to price performance risk and accordingly this category of risk is set to zero in its submission.

7.114 On the basis set out above London Underground proposes a risk provision of £224.1 million at the P(80) level of risk.

7.115 Tube Lines proposes a risk allowance of £302 million, also based on the P(80) level of risk, stating that this is the minimum that the lenders' technical adviser would accept.

7.116 Tube Lines argues that its forecast risk allowance for asset, inflation and corporate risk for RP2 is consistent with that of London Underground and compares favourably with the Arbiter's Initial Ranges estimate. Tube Lines' initial assessment of performance risk was based on the difference between its P(50) and P(80) performance revenue forecasts but has been amended in accordance with paper 55 of the 6.5 letter. This reduces risk amount because the (positive) P(50) revenue is not accounted for in Tube Lines costs.

7.117 Tube Lines considers that in the current economic climate there is a significant chance of large errors in forecasts of cost and inflation. It has proposed an alternative mechanism for the treatment of differential Inflation to London Underground.

7.118 The technical report prepared by the Arbiter's advisers set out base asset costs at a central P(50) level together with high (P(80)) and low (P(20)) cost for each asset area. A similar central estimate is calculated for A&O costs. For the purposes of considering the risk allowance, the Arbiter has adopted Tube Lines' and London Underground's A&O costs as the high and low case. These ranges of base costs take into account volume and unit cost estimating risks.

7.119 The technical report also includes a risk register containing a number of high impact, low probability events. However, the Arbiter considers that the Notional Infraco is protected from such risks by the Extraordinary Review mechanism, which he considers is the appropriate mechanism to treat such events and therefore he has not made any additional allowance for risks.

7.120 The Arbiter considers that in making allowance for risk it is appropriate to assess both the programme schedule and costs for the upgrade projects at the P(80) level. The Arbiter's considers that the benchmarks set by London Underground implicitly incorporate an appropriate allowance for risk so that the revenue outcome on performance is expected to be neutral. No further allowance is made for performance risk.

7.121 The Arbiter's analysis takes the above estimates of base costs and estimating uncertainty and combines these using a Monte Carlo simulation. The analysis includes an allowance for corporate risk that has been set at the mid-point level of the Extraordinary Review materiality threshold. This results in a larger risk allowance than shown by Tube Lines. However, Tube Lines includes significant contingency in its base costs to bring them to what it considers to be the P(50) level. The Notional Infraco's forecasts of base costs are more top-down than either of the Parties' forecasts. Although such top-down estimates are robust it is expected that there will be a wider statistical range of uncertainty on the outcome than that derived from a detailed, though possibly incorrect, bottom-up forecast.

7.122 As noted above, the Arbiter has used the faster recovery sensitivity in reaching his view of the differential inflation allowance. However, the Arbiter recognises that the assumptions on which this is based do not

represent the only possible outcomes and that the likelihood of alternative outcomes is increased by the currently uncertain economic environment.

7.123 In an attempt to account for this uncertainty, the Arbiter has estimated the risk provisions which the Notional Infraco might reasonably be allowed to compensate it for two types of risk in respect of the differential inflation allowance as follows:

- the risk that the indices selected will not track movements in the Notional Infracos' costs; and
- the risk that the projections of the indices on which the differential inflation allowance are based do not reflect the actual movements in these indices.

7.124 The Arbiter's approach to estimating these risk amounts is described more fully in his economic advisers report. However, in summary, the Arbiter has sought to consider a range of analysis including:

- the different differential inflation allowances that are generated by the central and alternative scenarios developed by the Arbiter economic advisers and comparing these to the allowances generated by the faster recovery scenario;
- an analysis of the historical volatility of the indices used to develop the Arbiter's differential inflation projections; and
- the differential inflation amount that would have existed in a comparable time period based on actual levels of the indices used to develop forecasts.

7.125 In order to establish a risk allowance for differential inflation, the Arbiter has simply taken the mid-point of the range estimated by the above described analysis. By applying this approach, the Arbiter's view is that the appropriate risk allowance for the Notional Infraco, in respect of differential inflation, is £160m. This amount is compared to the Parties views in the table below.

Table 7.18: RP2 inflation risk allowance – Parties' submissions and Arbiter's assessment

	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 prices		
Inflation risk allowance	129	56	160

Source: Arbiter's cost model

7.126 The Arbiter notes that his view of the relevant differential inflation allowance is above Tube Lines' view. This is not surprising in that one would expect a higher overall differential inflation allowance to be associated with a lower corresponding inflation risk allowance. If Tube

Lines' had developed its view using the same approach as the Arbiter, it would likely result in an even lower risk allowance; its higher allowance is most probably representative of the differing approach to calculating this allowance which Tube Lines has adopted.

7.127 The risk allowance assumed by both the Arbiter and Tube Lines reflects the considerable uncertainty in estimates of future inflationary movements. One option available to the Parties, which would remove the need to pay part, or perhaps all, of this risk amount, is to introduce the alternative mechanism that they have been discussing.

7.128 The Arbiter's total risk allowances are shown in the table below, which also shows London Underground and Tube Lines proposed risk allowances for comparison.

Table 7.19: RP2 risk allowances – Parties' submissions and Arbiter's assessment

Risk allowances	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Real Terms		
Asset risk	86	137	204
Corporate risk	87	31	59
Inflation risk	129	56	160
Total	**302**	**224**	**423**

Source: Arbiter's cost model

Total costs

7.129 The Arbiter's overall assessment of operating and capital costs for the Notional Infraco, after allowing for efficiency, differential inflation and risk, in accordance with the terms of the PPP Agreement and the guidance from the Parties, is set out in the table below.

Table 7.20: Total RP2 costs – Parties' submissions and Arbiter's assessment

Asset Area	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Real Terms		
Rolling stock	68	34	3
Signalling	832	386	532
Depots	46	17	0
Track & civils	121	39	0
Total line upgrades	**1,068**	**476**	**535**
Rolling stock	1,085	876	978
Signalling & control	194	159	183
Depots	17	16	16
Total trains	**1,296**	**1,052**	**1,177**
Premises & systems	704	496	542
Lifts	111	77	37
Escalators	253	154	189
Total stations	**1,068**	**728**	**768**
Track	640	515	496
Civils	194	189	186
Total infrastructure	**876**	**703**	**681**
Total asset costs	**4,308**	**2,959**	**3,162**
Central costs	881	661	782
Total base costs	**5,189**	**3,621**	**3,943**
Differential Inflation	405	184	172
Efficiencies	(130)	(38)	(143)
Risk	302	224	423
Total costs	**5,766**	**3,991**	**4,394**

Source: Arbiter's cost model

Comparison to initial ranges

7.130 The Arbiter's Initial Ranges guidance provided an estimate of the range of costs that would be incurred by a Notional Infraco in RP2. The range was assessed at £5.1–£5.5bn (February 2007 real terms). In order to compare these figures to the revised figures above, the earlier estimates need to be adjusted, for example to reflect agreed changes in scope and the change in price base, to put them on a comparable

basis. The comparable range is £4.2–£4.6bn (February 2008 real terms).

7.131 The main changes since the Initial Ranges guidance was published are:

- indexation of 3.65% (the RPIX increase in the year to February 2008, an increase of some £200m);
- inclusion of lease charges, rather than purchase price, of Piccadilly Line trains (a reduction of about £460m);
- other scope changes in particular in relation to the size of the stations programme, including the effects of the initial paragraph 6.5 guidance, amounting to a reduction of some £600m.

7.132 Given that the Initial Ranges guidance did not consider Notional Infraco performance in RP1, and these draft directions have taken a more detailed approach to assessing costs, some variation can be expected. However, the Arbiter's revised assessment of costs is around the mid-point of the adjusted range.

Comparison to unit costs projected for the former Metronet Infracos

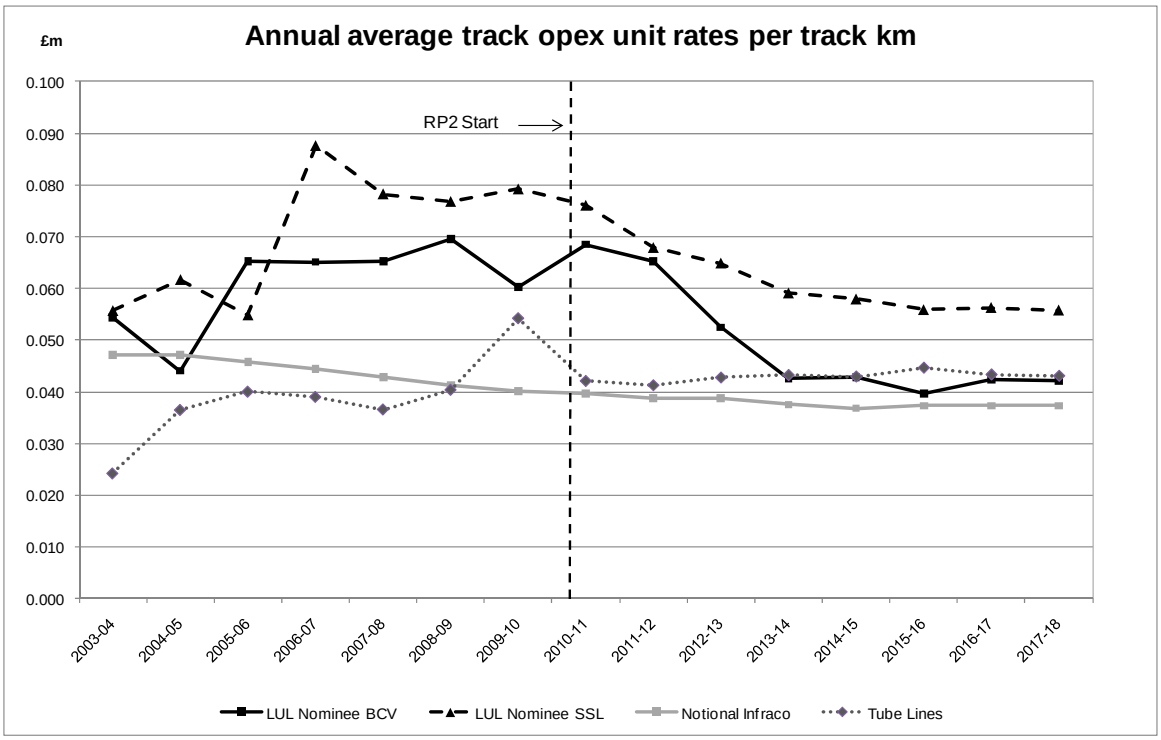
7.133 As part of the evidence used to assess Notional Infraco costs, the Arbiter has considered the unit costs now being projected by London Underground for the former Metronet Infracos.

7.134 In a recent published Board paper London Underground presented an analysis of unit costs projected by Tube Lines for the purpose of this reference against internal unit costs projected by the former Metronet Infracos. These have been updated to show Tube Lines' 17 November submission and the costs included in the Arbiter's draft direction[41].

7.135 This comparison suggests that for track maintenance, the Notional Infraco costs assessed by the Arbiter would be below those projected by London Underground for the former Metronet Infracos. In the case of rolling stock opex, the position is less clear, as the figures are affected by different timing and cost assumptions in respect of refurbishment programmes.

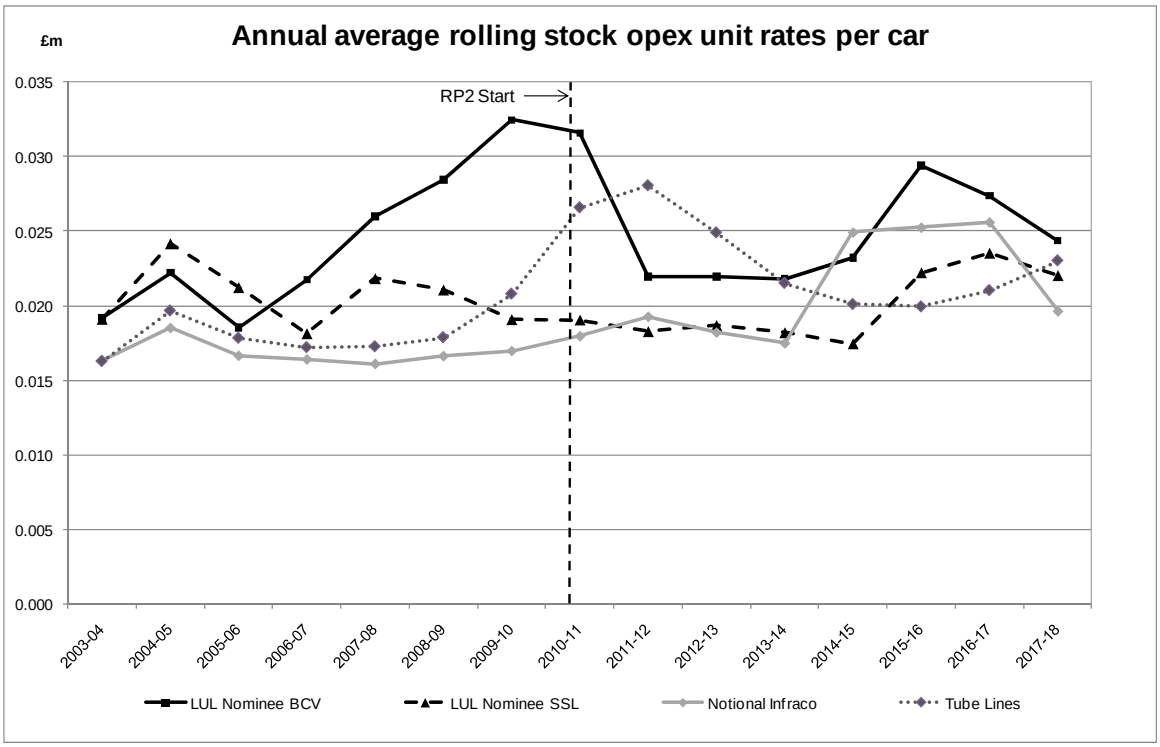
[41] Cost data are taken from the agreed PPP Data Breakdown Structure (DBS) for each line on the graph. Volumes data is taken as the track km figure provided separately by each Party in the DBS, except in respect of Tube Lines rolling stock, where the Arbiter's assumption for number of cars is used due to the Tube Lines figure being inconsistent with the volume required.

Figure 7.3



Source: Arbiter's cost model, Notional Infraco volumes DBS sheet, Tube Lines 17 November 2009 submission to the Arbiter and LUL Nominee BCV and SSL Draft Annual Asset Management Plans DBS 4 December 2009

Figure 7.4



Source: Arbiter's cost model, Notional Infraco volumes DBS sheet, Tube Lines 17 November 2009 submission to the Arbiter and LUL Nominee BCV and SSL Draft Annual Asset Management Plans DBS 4 December 2009

Cost estimates for RP3 and RP4

7.136 For the purposes of making directions on the relevant cash flows, the Arbiter's analysis includes a high level assessment of Notional Infraco costs for RP3 and RP4. The strategy for each area is set out in the table below.

Table 7.21: Notional Infraco strategy in RP3 and RP4

Asset Area	Strategy
Line upgrades	No costs are assumed since work is completed in RP1 and 2
Signalling	The signalling maintenance costs continue at the same level through into RP3 and RP4. However TBTC renewals are required. These are included based on costs determined from the Parties' submissions
Trains	The strategy for RP3 and 4 is unchanged with the exception of an assumption that the Northern Line maintenance contract is renegotiated or retendered. Maintenance costs are then assumed to fall to benchmark levels
Stations	
Premises & systems	The number of Refurbishments has changed materially for RP2 and this is continued in RP3 and RP4. Refurbishments have been priced using the methodology applied in RP2. Given the lower number of refurbishments investment is also made in station services to ensure all assets are in Condition A to C by the end of RP3. For RP4 at a high level less renewals are expected and it is assumed that 50% of the RP3 expenditure would be sufficient
Lifts & Escalators	The model used in RP1 and RP2 is extended into RP3 and RP4 to provide a programme of interventions for these assets through to the end of the contract
Infrastructure	
Track	Renewal volumes and costs RP2 are assumed to continue into RP3. Maintenance costs reach the benchmark level by the end of RP2 and therefore remain unchanged in RP3 and RP4
Civils	A similar volume of renewals to that undertaken in RP2 will be required in RP3. RP4 will largely return to the RP1 inspection and maintenance regime

7.137 For central costs the A&O component is assumed to be the same in RP3 and RP4 as was the case in RP2. Other costs are treated in the

same way except in respect of pensions where no allowance is made for a deficit and in RP4 Periodic Review costs have been excluded. Similarly Other separately identified costs are assumed to be the same as for RP2 but secondment fees are recalculated in line with the base costs set for the Notional Infraco.

7.138 An assessment has also been made of cost overlays and this is described in the table below.

Table 7.22: Assumptions about overlays in RP3 and RP4

Area	Approach
Differential inflation	Takes the index for the last year of RP2 and assumes that this applies in all subsequent years.
Efficiencies	Are assumed to continue at 1% per annum
Risk	Due to the current economic environment, there is more uncertainty of inflation in the near term than is usual and it is assumed that by the next Periodic Review inflation will trend towards the government's inflation target and the forecasting of both inflation and differential inflation will become less uncertain. The inflation risk allowances for RP3 and RP4 assume a reduction of 20% from the RP2 level of £128m and are further reduced in proportion to the lower base costs forecast for RP3 and RP4. Inflation risk is profiled pro-rata to base costs. The Notional Infraco's inflation risk allowance for RP3 and RP4 is £97m and 83m respectively.

7.139 The results of this analysis are set out in the table below.

Table 7.23: Arbiter's assessment of total costs for each Review Period

Asset Area	RP2	RP3	RP4
	£m February 2008 Real Terms		
Rolling stock	3	0	0
Signalling	532	0	0
Depots	0	0	0
Track & civils	0	0	0
Line upgrades	**535**	**0**	**0**
Rolling stock	978	1,088	949
Signalling & control	183	190	193
Depots	16	16	16
Trains	**1,177**	**1,294**	**1,158**
Premises & systems	542	663	513
Lifts	37	85	65
Escalators	189	268	159
Stations	**768**	**1,017**	**737**
Track	496	492	492
Civils	186	182	84
Infrastructure	**681**	**674**	**576**
Variations Transition and special Projects	**0**	**0**	**0**
Total asset costs	**3,162**	**2,985**	**2,471**
Central costs	782	711	697
Total base costs	**3,943**	**3,696**	**3,168**
Differential Inflation	172	526	816
Efficiencies	(143)	(320)	(398)
Risk	423	331	318
Total costs	**4,394**	**4,236**	**3,907**

Source: Arbiter's Cost Model

8. Notional Infraco performance revenues in RP2

8.1 This chapter:

- discusses the Parties' submissions on performance revenue;
- sets out the Arbiter's approach to calculating performance revenues and performance risk;
- describes how consistency with the technical analysis of costs has been maintained; and
- shows the build up of revenues for the Notional Infraco and compares this to the Parties' projections.

The Parties' submissions on Performance revenue

8.2 In their representations, the Parties provided revenue projections for Capability, Availability, Ambience and Service Point for the remainder of the PPP contract.

8.3 The Parties' submissions included zero, or close to zero, revenues for Jubilee Line Capability due to an agreement on contractual interpretation since the issue of Restated Terms which is set out in the paragraph 6.5 guidance. A change to Restated Terms has been proposed which significantly alters the Capability Benchmark and Unacceptable levels such that when the Journey Time Capability Target for the Jubilee Line upgrade is met, zero revenue is paid. The Arbiter's assessment has adopted this proposed change given that it is agreed in principle as a contract change by the Parties.

8.4 In their negotiations the Parties sought to agree on areas where Tube Lines' costs could be reduced. One area addressed was the Tube Lines performance risk provision where the Parties have agreed that performance revenue and risk for both Parties should be priced at the P80 level.

8.5 As part of this agreement, the Parties also agreed that the P80 revenue position should result in a net position of zero performance revenue under each stream of non-Capability performance. The Arbiter has also priced performance revenues at a P80 level; however the effect on the Notional Infraco revenues of a P80 level is different to the Parties; this gives a forecast of positive non-Capability revenues.

Arbiter's approach to assessing performance levels

8.6 Although the Arbiter has undertaken a bottom-up approach, has used the contractual performance models and has independently modelled inputs for use in these models, he has not undertaken detailed modelling to the same degree as the Parties in order to forecast revenues for the Notional Infraco. To reflect the materiality of Capability revenues, performance under this aspect of the regime was assessed in more detail than the Availability regime, and that in turn was addressed in more detail than the Ambience and Service Point regimes.

8.7 The performance levels of the Notional Infraco are consistent with the strategy of the Notional Infraco as set out in chapters 6 and 7. In order to ensure a consistent approach an iterative approach was applied to the development of performance levels (and resulting revenues) and costs.

8.8 In assessing Capability, the contractual models for each line upgrade and the population of these by the Parties was explored in detail, focusing on the factors that contribute to improvements in train run-times through line upgrades and other works. The sensitivity of Capability outcomes to different assumptions about key inputs was tested in order to inform the consideration of alternative strategies. Once the Notional Infraco strategy in respect of Capability and line upgrades had been determined, the contractual Capability model was populated, based on an estimate of the impact on runtimes of rolling stock and signalling changes, derived through regression analysis.

8.9 In order to assess Availability performance, the Arbiter calculated the expected level of performance consistent with the asset condition assumptions underpinning the Notional Infraco technical solution. This was taken as the RP1 closing position. Monte Carlo simulation was then used to simulate different performance outcomes (at both the P(50) and P(80) levels) and establish a baseline projection for RP2 moving forwards from the RP1 closing position. An overlay was applied to the baseline to take account of the expected magnitude and profile of disruption immediately following upgrade work, as well as the anticipated longer term improvement resulting from the replacement of assets. Sensitivity analysis was undertaken to determine a range of outcomes.

8.10 RP2 Ambience performance was assessed by estimating the impact of refurbishments and the introduction of new trains on the Ambience scores for each line. The Arbiter reviewed London Underground's Ambience model and Tube Lines' methodology in order to derive assumptions for the uplift in score following improvement works and the degree and profile of degradation that could be expected following such works. The level of cleaning that a Notional Infraco could be expected to undertake, given the incentives generated by the Ambience regime, was also considered. The projections for RP2 were based on the RP1 closing position, taking account of the RP2 programme of station and train refurbishments/replacement and the modified weighting of Ambience scores in the overall calculation.

8.11 To assess the Service Points incurred by the Notional Infraco the Arbiter considered the incentives generated by the performance regime, taking account of changes to the thresholds for determining the level of abatement and the introduction of new thresholds for RP2. For most categories of Service Points, the Notional Infraco is assumed to perform in line with the relevant threshold level, although in the case of engineering overruns a separate projection was prepared based on an analysis of historical data.

8.12 A Performance Payment Model (PPM) has been used to replicate the Performance Payment Mechanism set out in Schedule 4.1 of the PPP Agreement. This model calculates revenue and abatement amounts from the contractually specified performance levels and summarises them into a format for transfer into the Arbiter's cost model. The PPM was independently reviewed after being produced by the Arbiter, ahead of being used to calculate revenues from the Notional Infraco performance levels. The PPM used to calculate Notional Infraco Revenues includes input assumptions up to date to the latest proposed changes to Restated Terms in the 6.5 guidance by the Parties in addition to the latest version of Restated Terms[42]. The PPM populated for the Notional Infraco has been shared with the Parties.

8.13 The performance contribution to the overall Notional Infraco risk amount is considered to be zero. The Arbiter has assumed that the Notional Infraco would aim to deliver the Line upgrades early and include a moderate margin over the target to mitigate for any risk of the technical solution not reaching it. The cost of this is included in the upgrade base costs but any benefits of delivering early or over the target are not reflected in the revenues providing potential up-side. Hence, no additional risk amount is required for Capability.

8.14 For the other performance revenue streams, the inclusion of Risk Adjusted Benchmarks designed to reflect zero revenues at the P80 level in Restated Terms means that a Notional Infraco would not expect to price any additional risk of not meeting these. In fact, the Notional Infraco forecasts net revenues overall and hence expects to benefit from up-side risk as opposed to requiring provision for down-side risk.

Consistency with approach to the technical analysis of costs

8.15 The contractual performance model inputs were sourced from an initial Notional Infraco strategy. Proposed levels of expenditure and hence expected performance outcomes were fed back into the Contractual Performance models as the strategy developed to refined the outcome. This process was repeated for several iterations at line level ahead of a final Notional Infraco solution combining optimal costs and revenues was reached.

8.16 For areas where assumptions needed to be informed both by the incentives of the performance regime and the costs associated with the incentivised behaviour; the Arbiter ensured close co-ordination of the development of assumptions across the two work streams.

Notional Infraco revenues and comparison with the Parties

(a) Capability

8.17 The Notional Infraco is assumed to deliver the Jubilee Line upgrade on time (31 December 2009) and so receives £15m in bonuses as a result

[42] The PPM used does not mirror the most recent version of Restated Terms available at the time of writing; the Arbiter assumes that the changes jointly proposed by the Parties will become formally part of Restated Terms ahead of the Arbiter's final directions and guidance.

in the last 6 months of RP1, which is similar to the current Tube Lines projection[43]. The Notional Infraco would not undertake major non-upgrade capital works on the Jubilee Line so would not receive any other significant revenue from Capability prior to this.

8.18 For the Northern and Piccadilly Lines, the Notional Infraco is assumed to undertake a similar level of non-upgrade capital works in RP1 to Tube Lines and hence the Arbiter has assumed that it would achieve similar Capability levels to those actually achieved by Tube Lines. The resulting revenues are £15m for the Northern and £16m for the Piccadilly Line.

8.19 Assumptions about the Northern Line upgrade JTC target were included in the initial paragraph 6.5 guidance to the Arbiter. The Arbiter has adopted this guidance, and as a consequence has assessed that the Notional Infraco would deliver the upgrade on time, receiving bonuses from the Latest Implementation Date totalling £286m in RP2. This is close to Tube Lines' revenue forecast. London Underground assumes a Notional Infraco would deliver the upgrade early and includes the additional revenue received for this in its forecast; hence it includes a larger amount of £325m in its submission.

8.20 Capability revenue for the Piccadilly Line upgrade in RP2 reflects new rolling stock and new signalling. Although the two stages of the upgrade are to be completed towards the end of RP2, the step up in performance is large. New rolling stock is introduced onto a line gradually and the Notional Infraco can be expected to receive some increase in Capability revenue due to trains with higher capacity on the line over the three years prior to the Latest Implementation Date. Any bonus relating to the new signalling system is not assumed until the Latest Implementation Date. This gives a revenue of £171m, which is between the Parties' projections reflecting more optimistic assumptions than Tube Lines (£154m) who does not assume benefits from the phased delivery of rolling stock until the Latest Implementation Date. As with the other upgrades, London Underground assumes bonuses from early delivery of full Capability in addition to the gradual introduction of rolling stock.

(b) Availability

8.21 In RP1 the Arbiter considers that the Notional Infraco would have had similar Availability performance as Tube Lines, although with slightly better performance in the sub-areas of track (due to a larger scope of non-upgrade track renewal works than Tube Lines) and Northern Line rolling stock (due to the assumption that the sub-contracted maintenance on this line could reflect the same performance level as that of the Jubilee Line with a similar maintenance contract). Despite this, large fluctuations in performance in RP1 combined with the adverse effect of the Jubilee Line upgrade, means that the Notional Infraco incurs a small net abatement in RP1 of £5m.

[43] London Underground does not project Jubilee Line Capability revenue for RP1.

8.22 By the end of RP1 the Notional Infraco has a good level of Availability performance on all lines and this is carried through as the underlying Notional Infraco performance level for RP2 to RP4. The adverse effect of the upgrade works affects all lines in RP2, leading to short periods of poorer performance, but overall Availability revenues in RP2 are much higher than in RP1, at £46m. This is also affected by changes to the Availability regime in Restated Terms which allow a higher level of lost customer hours before abatements.

(c) Ambience

8.23 Ambience revenue for the Notional Infraco is considered to be a small bonus of £5m in RP1, which reflects a similar strategy and level of performance to Tube Lines in RP1. In some periods abatements were suffered, but more bonuses were earned, hence a net revenue overall.

8.24 The Ambience regime has changed as a result of Restated Terms and hence the Notional Infraco strategy has changed, as has the projected performance against the Benchmark. Whilst the Notional Infraco would not plan to spend significantly less on items which affect the Ambience score, the re-calibration of the regime means that the Notional Infraco expects a very small abatement of approximately £3m overall in RP2.

(d) Service Points

8.25 The Notional Infraco would have responded to the Service Points regime in RP1 in a similar way to Tube Lines; hence improving performance gradually throughout the Review Period to reduce the level of abatement. At the beginning of RP1 the Arbiter considers that the Notional Infraco would have experienced considerable volatility in the number of Service Points incurred due to the ‘bedding-in’ period required. Hence, the Notional Infraco would have incurred a similar abatement to that of Tube Lines in RP1 of £28m.

8.26 Once the ‘bedding-in’ period is over the Notional Infraco would settle at a more constant level of Service Points from RP2 to RP4. Despite the inclusion of new categories of Service Points in Restated Terms introducing some uncertainty, the threshold for abatements has become more generous for some of the existing categories. The Notional Infraco would expect to perform close to the threshold level and hence receive zero revenue for RP2 to RP4.

Overall revenue impact

8.27 The Parties’ performance revenue as submitted on 17 November and those of the Notional Infraco are shown in the table below.

Table 8.1: Total RP2 performance revenues – Parties' submissions and Arbiter's assessment

Performance revenue	Tube Lines' submission	London Underground's submission	Arbiter's assessment
	£m February 2008 Real Terms		
Jubilee Line Capability	0	(2)	(1)
Northern Line Capability	(288)	(325)	(286)
Piccadilly Line Capability	(154)	(188)	(171)
Total Capability	**(442)**	**(515)**	**(458)**
Specific Projects Adjustment	0	0	0
Jubilee Line Availability	0	0	(18)
Northern Line Availability	0	0	(22)
Piccadilly Line Availability	0	0	(13)
Total Availability	**0**	**0**	**(52)**
Ambience	**0**	**0**	**3**
Service Points	**0**	**0**	**0**
Total	**(442)**	**(515)**	**(507)**

Source: Arbiter's cost model; N.B. Negative numbers in the table above are revenues (i.e. negative costs); abatements are therefore shown as positive.

Performance revenue in RP3 and RP4

8.28 The Arbiter has assessed performance revenue on a basis consistent with the analysis of costs, as described in chapter 7. This is set out in the table below.

Table 8.2: Performance revenues for RP2, RP3 and RP4 – Arbiter's assessment

Performance revenue	RP2	RP3	RP4
	£m February 2008 Real Terms		
Capability	(458)	(745)	(745)
Availability	(52)	(43)	(43)
Ambience	3	2	2
Specific Projects Adjustment	-	-	-
Service Points	0	-	-
Total	(507)	(786)	(786)

Source: Arbiter's cost model; N.B. Negative numbers in the table above are revenues (i.e. negative costs); abatements are therefore shown as positive.

9. Treatment of RP1 pension deficit

9.1 This chapter:

- describes the background to this issue and the Parties' respective positions on the RP1 pensions deficit;
- describes the Arbiter's approach to the RP1 pensions deficit; and
- establishes the amounts that are included in the negative cashflows within the Arbiter's direction under paragraph 1.5(a)(i) of Schedule 1.9 that relate to the recoverable amount and recovery period for this pensions deficit.

Background and the Parties' respective positions

9.2 Within its reference for a direction under paragraph 1.5(a)(i) of Schedule 1.9 as to the amount and timing of the relevant cashflows, London Underground specifically sought a direction on "the amounts (if any) included in the negative cashflows arising from the RP1 pension deficit".

9.3 As part of Restated Terms, London Underground introduced an indemnity for Infraco for pension costs in respect of Tube Lines' section of the TfL Pension Fund (TfLPF) after the Restated Terms Effective Date such that Tube Lines' contribution rate is capped at 21.5% of pensionable salaries with any excess over that amount being repaid by London Underground as an Exceptional Amount.

9.4 The pensions indemnity drafted in clause 39 and Schedule 1.14 of the restated PPP Agreement does not cover any deficit that arose during RP1. Equally the indemnity does not cover additional costs arising from salary inflation beyond the amount assumed in the latest actuarial valuation for Metronet and the other public sector sections of TfLPF which is for a real wage growth of 1.5% per annum.

9.5 Notwithstanding London Underground's position in drafting the Restated Terms, Tube Lines has sought to include within its costs for RP2 an amount that relates to the potential recovery plan for a pensions deficit arising in RP1.

9.6 Within his issues paper of 14 October the Arbiter stated that he was minded to treat costs associated with meeting a pensions deficit that arose prior to the Review Date as not falling within "the other operating and capital costs of a Notional Infraco of performing its activities after the Review Date"[44].

9.7 In its representations on the issues paper dated 17 November, London Underground agreed with this initial view and, subsequently, it provided a summary of the actuarial valuation as at 31 March 2009 dated 9 November which shows that the deficit is £86.4m. London Underground drew attention to the fact that £11.4m of the deficit relates

[44] See paragraph 7.2(b) of Schedule 1.9

to salary growth in excess of assumptions at the last valuation which were for a real wage growth of 1% per annum.

9.8 The deficit as at 31 March 2009 is set out in table 9.1 below.

Table 9.1: Actuarial valuation of Tube Lines' section of TfLPF

	£m (March 2009 prices)
Deficit as at 31 March 2006	(7.8)
Interest on deficit	(1.5)
Investment performance compared to that assumed in 2006	(64.9)
Actual contributions compared to cost of benefit accruals	3.1
Actual salary growth compared to that assumed in 2006	(11.4)
Inter-section transfers on terms differing from 2006 basis	(2.9)
Miscellaneous items	1.3
Change in financial assumptions	(1.7)
Change in statistical assumptions	(0.6)
Deficit as at 31 March 2009	(86.4)

Source: Watson Wyatt Limited

9.9 In its representations dated 17 November Tube Lines argued that:

- "a [Notional Infraco] faced with a perceived deficit in its pension fund would agree a recovery plan with the fund Trustees spreading required payments over a number of years, and the cost falling due to be met in those years is simply a cost of doing business in the year in question"; and
- "unless the cost in question were brought about by some failure to act as [a Notional Infraco] would have acted in a prior Review Period ... the costs in question are costs of [a Notional Infraco] of performing its activities in the relevant year: they are no different from any other costs associated with the employment of personnel".

9.10 Tube Lines has contended that none of the factors identified in table 9.1 above been brought about by actions of Tube Lines during RP1 which are inconsistent with the steps that a Notional Infraco would take. Tube Lines also argues that, in the event of a deficit, good industry practice is to agree a recovery plan with the pension fund Trustees.

9.11 Tube Lines asserts that whilst a recovery plan has to be agreed by the Pensions Regulator, this is likely to be contentious only if the plan were to be for longer than 10 years. Tube Lines notes that London Underground agreed a recovery plan of 7 years for the deficit in

Metronet's section of TfLPF in 2007 and cites recent evidence that 8.9 years is appropriate.

9.12 Whilst Tube Lines' representations on the issues paper note that the deficit may be about £90m, the figure within Tube Lines' DBS and described in its Administration and Overhead (A&O) section is shown as £60m. The Arbiter understands that the figure of £90m is based on the initial findings of the actuaries Watson Wyatt dated 19 October 2009 which recorded the deficit at £91.8m and the DBS figure of £60m is based on an assumption that the final deficit will be settled at £80m to which a 10 year recovery plan will be agreed with the Pension Regulator. Hence over the 7½ year second Review Period 75% of the deficit to be recovered which equals £60m.

Arbiter's approach to the RP1 pensions deficit

9.13 When considering the appropriateness of the deficit and the duration of recovery period, the Arbiter has looked at the approach The Pensions Regulator (TPR) has taken with schemes where the employer is subject to price regulation.

9.14 Whilst TPR notes the distinction between a notional recovery period agreed by a regulator as compared to the actual recovery plan agreed between the Trustees and TPR, TPR's publication titled "Scheme funding: An analysis of recovery plans" dated November 2009[45] shows an average recovery period for all private sector schemes in the most recent phase of its analysis to be 8.3 years.

9.15 In coming to a view as to the amounts (if any) to be included in the negative cashflows arising from the RP1 pension deficit the Arbiter has also considered what would happen in the event of a Mandatory Sale or disposal by a PPP Administrator as this is expressly provided for in Restated Terms[46]. In such circumstances Tube Lines is obliged, to the extent possible, to procure that any successor Infraco becomes responsible for Tube Lines' section of TfLPF and would therefore inherit any outstanding pensions deficit. If in the event that Infraco were to revert to TfL/London Underground ownership as has been the case with BCV and SSL then these liabilities would revert to TfL/London Underground and therefore continue to be met.

Amounts that are included in the Arbiter's negative cashflows for a Notional Infraco

9.16 Having noted the representations made by the Parties to his issues paper the Arbiter proposes to allow £73m of the deficit within Notional Infraco operating costs[47] on the basis that a Notional Infraco has less ability to anticipate a pension fund's investment performance than the impact of its salary awards. The Arbiter accepts Tube Lines'

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45 See www.thepensionsregulator.gov.uk/pdf/scheme-funding-analysis-2009.pdf

46 Schedule 1.14, paragraph 3

47 Calculated as the £86.4m deficit less the £11.4m attributable to salary growth in excess of the previous actuarial assumption. This nets to £75m in March 2009 prices which is then restated to February 2008 prices.

representation that funding the appropriate portion of such a deficit is part of the operating and capital costs of a Notional Infraco when performing its activities after the Review Date.

9.17 For the purpose of the reference the Arbiter has assumed that the deficit is to be funded by Infraco over a recovery period of 7½ years i.e. over one review period, commencing from 1 April 2010 and payable mid-year. The rationale for a 7½ year recovery period is that it is similar to TPR's recent findings and London Underground's approach to Metronet's deficits. The 7½ year period also fits well with the next Periodic Review.

9.18 The Arbiter has therefore allowed £9.7m per annum which equates to £73m over the course of RP2 as compared to Tube Lines' figure of £60m and London Underground's figure of nil. This allowance has been included in the Arbiter estimate of Notional Infraco central costs.

10. Relevant cashflows

10.1 This chapter:

- identifies the relevant negative and positive cashflows of the Notional Infraco over the contract period;
- presents the Arbiter's assessment of the relevant costs and revenues; and
- considers the timing of the relevant cashflows as compared to these costs and revenues.

Relevant negative and positive cashflows

10.2 London Underground has sought a direction pursuant to paragraph 1.5(a)(i) of Schedule 1.9 as to the amount and timing of the relevant cashflows.

10.3 The relevant positive (revenue) and negative (cost) cashflows are set out in paragraphs 7.2 and 7.3 of Schedule 1.9 to the PPP Agreement. The Arbiter's draft directions cover only the cashflows in paragraphs 7.2 (a/b), 7.2 (b), 7.2(f) and 7.3(d).

10.4 The Arbiter has received no notifications pursuant to paragraph 6.6, and therefore makes no direction pursuant to paragraphs 7.2(e) or 7.3(e).

10.5 For the reasons set out above, the Arbiter is not making draft directions on other cashflows relating to financing matters at this stage. His initial thoughts on how he might develop directions in respect of these other cashflows are set out in section 4.

10.6 The largest elements of the relevant cashflows is "the operating and capital costs of the Notional Infraco in performing its activities after the Review Date" (paragraph 7.2 (a/b) and (b)). The Arbiter's assessment of the costs of these amounts is set out in chapter 7 above.

10.7 Paragraph 7.2(f) refers to "Net Adverse Effects incurred in the last Review Period in excess of the Materiality Threshold that have not been compensated previously pursuant to an Extraordinary Review". The Arbiter's assessment is that this amount is nil as described in chapter 6.

10.8 Paragraph 7.3(d) refers to "the amount of any increases to be made to the ISC in relation to the Delivery into Service of the Specified Line Upgrades that are not yet Delivered into Service and having a Latest Implementation Date following the Review Date". For the reasons set out below and explained more fully in the Arbiter's draft Analytical Approach to calculating ISC, the Arbiter has considered all areas of performance (and not just Capability performance in respect of Line upgrades) as set out in chapter 8.

Timing of cashflows as compared to costs

10.9 In order to convert the accrued costs and revenues in section 3 to the relevant cashflows it is necessary to consider the need for a working capital adjustment to reflect, amongst other things, the lag in paying for costs and receiving payments.

10.10 When converting its DBS costs into its cashflows within its financial model Tube Lines has made the following adjustments:

- a movement in non ISC related debtors over RP2 which results in a net increase in cash available of £25m in RP2; and
- a movement in opening and closing creditors in RP2 which results in a net decrease in cash available of £10m in RP2 based on a 90 day payment cycle;

the net effect of these two movements is an increase in cash available in RP2 of £15m.

10.11 In addition Tube Lines shows an increase in the debt service reserve required for its existing finance of £48m over RP2 against which it offsets £14m of interest on cash balances.

10.12 The amounts identified by Tube Lines above result in a net use of cash in RP2 of some £18m. Similarly within its informal submission dated 29 June 2009 London Underground identified a working capital adjustment in RP2 of some £10m. But as these amounts relate to either to the setting of ISC, or are related to financing matters, the Arbiter's assessment of them will be made when providing draft directions of ISC and financing in March 2010.

10.13 For the affordability analysis set out in section 4, the Arbiter's working assumption is that the net effect of these factors is nil.

Cashflows by financial year

10.14 The projections of operating and capital costs and of performance revenues set out in chapters 7 and 8 were shown as totals for each Review Period. The tables below show the corresponding figures for each year in RP2[48].

Table 10.1: Arbiter's assessment of total costs for RP2

Operating and capital costs	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
	£m February 2008 Real Terms								
Total	**483**	**632**	**605**	**590**	**584**	**550**	**550**	**401**	**4,394**

Source: Arbiter's cost model

[48] Given that the Review Period is 7½ years from 1 July 2010, 2010-11 and 2017-18 both cover a nine month period.

Table 10.2: Arbiter's assessment of the relevant performance revenues for RP2

Performance revenues	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
	£m February 2008 Real Terms								
Capability	(1)	(12)	(51)	(55)	(72)	(94)	(99)	(74)	(458)
Availability	(7)	(7)	(8)	(6)	(7)	(6)	(6)	(4)	(52)
Ambience	0	1	1	0	1	(0)	0	0	3
Specific Projects Adjustment	0	0	0	0	0	0	0	0	0
Service Points	0	0	0	0	0	0	0	0	0
Total	**(8)**	**(18)**	**(59)**	**(61)**	**(77)**	**(101)**	**(105)**	**(79)**	**(507)**

Source: Arbiter's cost model

11. Minor Closures and L&E Closures required by a Notional Infraco in RP2

11.1 This chapter:

- provides the background to the request for guidance and the Parties' respective positions on access;
- describes the Arbiter's approach to calculating the access allowances; and
- establishes the allowances that are set in the Arbiter's draft guidance and compares these to the allowances proposed by the Parties.

The Parties' respective positions

11.2 As part of its reference London Underground seeks guidance as to the allocation of Minor Closures and of L&E Closures which would be required by a Notional Infraco for RP2.

11.3 As this is single party guidance the Arbiter has discretion as to whether or not to provide it. Accordingly Tube Lines was consulted on whether the Arbiter should give guidance on this matter. Tube Lines responded with three objections:

- that to do so would be premature;
- that determining the matter is outside of the Arbiter's jurisdiction; and
- that the request was an attempt to create a substantive term of the contract which is not permissible under the GLA Act or the PPP Agreement.

11.4 The level of access that the Notional Infraco has to the railway is an important driver of both the work programme and the associated costs. Having considered the arguments, the Arbiter wrote to the Parties on 5 October confirming that he had the powers to give guidance and that he considered that it would be appropriate to give the guidance requested, given that assumptions about closures were part of considering Notional Infraco strategy.

11.5 Tube Lines continues to dispute the technical achievability of Restated Terms and one of the foundations of this argument is that the RP2 obligations cannot be completed within the JNP Base Allocation of Minor Closures proposed by London Underground. Under paragraph 4.2a of Schedule 1.9 contentions of technical achievability are reserved to the Dispute Resolution Agreement and Tube Lines has now formally referred this matter to Dispute Resolution.

11.6 The base allocation of Minor Closures for RP2 as set out in Restated Terms is 21,500,000 LCH. The corresponding figure for L&E Closures is 6,250,000 LCH for RP2. The Parties also disagree as to the Base Allocation of L&E Closures.

11.7 For the purpose of the reference, given that Tube Lines has challenged the validity of Restated Terms, London Underground has provided alternative drafting which leaves the allowances unchanged but makes them subject to the Arbiter's analysis providing that his allowances do not exceed 26,842,506 LCH for Minor Closures and 9,501,929 for L&E Closures (the amounts suggested by Tube Lines in its Response to Restated Terms). The Arbiter is using this revised drafting as the basis for his draft directions and guidance.

11.8 The Parties initially set out their positions, in Tube Lines' case in its Response to Restated Terms and in London Underground's case in it informal submission. Since which time the Parties' negotiations have changed the scope of the obligations for RP2. In their recent representations, the Parties' proposals are as in the table below.

Table 11.1: Access requirements for RP2 – Parties' submissions

Access allowances	Tube Lines' submission[49]	London Underground's submission
	Million LCH	
Minor Closures	35.6	15.5
L&E Closures	9.3	6.1

Source: Parties' 17 November 2009 submissions

11.9 London Underground's representations are based on a Notional Infraco requiring minor closures for track work signalling upgrades and RVAR related works. For the upgrades London Underground considers that closures are required for signal installation works, on-line testing, commissioning and to demonstrate readiness for service. No closures are assumed for installation of station equipment rooms. Closures for RVAR works are proposed only where platform humps are to be installed or track raising is required. All works on stations are assumed to be performed in Engineering Hours or concurrently with other closures.

11.10 In respect of lifts and escalators London Underground estimates that 3.6m LCH are needed for capital works on lifts and 2.4m LCH for escalators. Routine maintenance on lifts and escalators is undertaken in Engineering Hours.

11.11 London Underground has not included contingency in its estimates because it considers that tolerance would balance out over the programme. There is also no risk provision within its estimates as it argues that the Notional Infraco is reimbursed or risk mitigated through the Access Code.

11.12 Tube Lines approach is similar although the results are quite different. It bases its access proposals on the assumption that the 6 hour average possession time agreed in 6.5 guidance will be implemented. On this basis Tube Lines considers that Minor Closures are required for

[49] Tube Lines' figures are taken from the evidence contained in its contractual claim.

track and line upgrade works only. RVAR work is to be implemented in conjunction with these works.

11.13 Tube Lines' considers track and line upgrade closures to be mutually exclusive as power must be off to perform track work and on for the line upgrade work. However it considers that there is some opportunity for optimisation of L&E closures with closures for upgrade works.

11.14 There is a significant gap between the Parties on Minor Closures. Tube Lines did not provide the required DBS data in its representations in November so the written particulars provided for the Minor closures dispute are used as the basis for understanding Tube Lines current position. Based on this document the underlying issue is primarily related to the amount of access required to complete the line upgrades which Tube Lines sets at more than 26m LCH compared to about 6m LCH now proposed by London Underground.

Arbiter's approach to establishing the access allowance

11.15 The work programme for the Notional Infraco is carried out in a combination of Minor Closures, L&E Closures, Engineering Hours and where permissible during Traffic Hours.

(a) Minor Closures

11.16 Track works require the largest proportion of Minor Closures due to the significant volume of work to be completed in RP2 and because it is generally less efficient to perform these works in Engineering Hours. The level of Minor Closures for track was therefore calculated first based on the track work volumes established for the Notional Infraco in RP2, this includes track work considered appropriate to support the upgrade projects.

11.17 The Notional Infraco utilises Engineering Hours for track maintenance and re-railing activities and uses Minor Closures for other activities. The number of Minor Closures is calculated from an assessment of the productivity rates for the required track activities. These are converted to LCH by utilising London Underground's access model to assess NACHs for Minor Closures at open, sub-surface and tube locations. These are then used to determine average LCHs for each category. The LCHs for RP1 are adjusted to reflect the difference between the NACHs values in RP1 and RP2, on which the model is based.

11.18 Access required for the signalling upgrades has also been considered. As discussed in chapter 7, the Notional Infraco adopts a different approach to the projects than that employed by Tube Lines. An advantage of this approach is that it requires significantly less access.

11.19 Approaches that limit access requirements were discussed at meetings between the Arbiter, the Parties and senior staff at Metro de Madrid and Metro de Paris; both metros have introduced major signalling upgrade projects with significantly lower amounts of access (taking account of the length upgraded) than has been achieved on similar projects in London.

11.20 In considering whether a similar approach is applicable in London, the Arbiter notes that, when the Jubilee Line upgrade was being planned, the approach to closures followed in some other metros might have been considered to be best rather than good practice. The Arbiter therefore considers that the Notional Infraco would not necessarily have adopted the strategy used by Metro de Madrid for the Jubilee Line and Northern Lines, but nevertheless would have used a more efficient strategy than that actually employed on the line. Tube Lines recognises that the Jubilee Line provides good experience of what can be achieved and has developed ways to optimise access during execution of this project.

11.21 For the Northern Line the Arbiter considers that the Notional Infraco would have continued with broadly the same strategy that was used by the Notional Infraco on the Jubilee Line but would use less slightly access than was used on the Jubilee Line reflecting the considerable experience gained growing expertise in executing upgrades. In the case of the Piccadilly Line, which has not yet started, the Arbiter considers that the experience of Madrid and Paris is particularly relevant and that the Notional Infraco should now be in a position to capture all of the benefits of using an alternative approach to implementing line upgrade projects.

11.22 Notwithstanding this view, the Arbiter considers that the standards and operating requirements in London are more onerous than those at other metros that are currently demonstrating high levels of access efficiency and that access to worksites in London appears to be more restrictive than at these metros.

11.23 In common with both Parties, the Notional Infraco does not utilise closures for civils work as this could be performed either in Engineering Hours or concurrently with closures allocated for other work. Similarly the Notional Infraco performs stations refurbishment programme in Engineering Hours. The Arbiter has assumed in his assessment of access required for stations that the contract will allow access for 6-hour shifts at stations being refurbished. A review of other asset areas established that no further Minor Closures were necessary.

11.24 Taking into account the closures required for track work and Line upgrades during RP2 the Arbiter's analysis suggests that the JNP Base Allocation of Minor Closures as set out in Restated Terms is sufficient.

(b) L&E Closures

11.25 In relation to lifts and escalators the Arbiter's analysis assumes that the RP1 strategy for these assets is maintained and developed in RP2. This strategy focuses on escalators renewals and one of the advantages of the modern standard escalator used in the Notional Infraco strategy is that it can be installed relatively quickly.

11.26 However the access calculation, which is carried out using average LCH, rather than a site specific programme given that the Parties did not provide such a programme, suggest that the JNP Base allocation of

Lift and Escalator Closures as set out in Restated Terms is insufficient and should be revised upwards to 7.8m LCH.

Access allowances and comparisons with the Parties

11.27 The allowances resulting from the Arbiter's analysis are set out in the table below, which also presents the Parties' representations, noting that Tube Lines did not submit access information in its latest DBS.

Table 11.2: Access requirements for RP2 – Arbiter's assessment and Parties' submissions

Access allowances	Tube Lines' submission[50]	London Underground's submission	Arbiter's assessment
	Million LCH		
Minor Closures	35.6	15.5	21.5
L&E Closures	9.4	6.1	7.8

Source: Notional Infraco DBS, Parties' 17 November 2009 submissions

[50] Tube Lines' figures are taken from the evidence contained in its contractual claim date 20 November 2009.

12. Material change in risk

12.1 This chapter addresses the contention by Tube Lines that the Restated Terms issued by London Underground in December 2008 constitute a Material Change in Risk. It discusses:

- the contention made by Tube Lines and London Underground's response to it;
- the Arbiter's analysis of the contention; and
- the implications of the current dispute on access allowances.

The contention made by Tube Lines and London Underground's response

12.2 In its Response to Restated Terms, Tube Lines made a contention that the Restated Terms involve a material change in risk. The definition of a material increase in risk is set out in paragraph 1.3(b) of Schedule 1.9 of Tube Lines' PPP Agreement which refers to new or varied obligations arising from the Restated Terms which are material in the context of Infraco's overall activities pursuant to the contact (a 'material change in risk'). As part of its reference, London Underground has sought a direction as to the correctness or otherwise of Tube Lines' contention. In the event that the Arbiter agrees with the contention, London Underground's reference goes on to seek guidance as to the specific changes the Arbiter considers necessary to Restated Terms to avoid this result.

12.3 In its Statement of Case London Underground sets out a number of contract changes set initially for the purpose of the reference but which are directed at reducing the risk that Tube Lines perceives in Restated Terms. Alternative drafting of this type is provided in each of the following areas:

- Closures;
- Piccadilly Line mixed mode areas;
- Asset Management Regime;
- Safety Change;
- Major Enhancements;
- Stations Ambience;
- Northern Line JTC; and
- Annual usage adjustment.

12.4 In the period between the reference being made in September 2009 and representations to the Arbiter on 17 November 2009, the Parties have worked together to resolve the issues that underpin Tube Lines' contention and the Arbiter understands that revised drafting on Stations Ambience, Safety Change, Major Enhancements and Annual usage adjustment has been formally agreed, as have various other changes

indicated by Tube Lines to potentially result in a material change in risk e.g. information, tax and the entire agreement clause. It is also understood that the Parties are close to agreement on other matters:

12.5 Notwithstanding the progress that has been made, the Arbiter notes that Tube Lines indicates in its representations that it does not withdraw this contention because:

"Whilst matters in relation to the Piccadilly Line Mixed modes areas have been addressed the risk in relation to performance risk remains, as does closures which is pending the outcome of the Dispute Resolution Agreement and the introduction of the Asset Management regime changes are said by London Underground to be only 'for the purposes of the reference."

12.6 Moreover Tube Lines states that the matter should not be determined now rather it should await the final set of Restated Terms and the outcome of the dispute on the closures allowances.

The Arbiter's analysis of the contention

12.7 The Arbiter considers that the matter can properly be considered now such that the Parties can review their respective positions in advance of final directions.

12.8 In 2008 the Arbiter published a report by CEPA on how a contention of Material Change in Risk might be assessed[51]. The report set out a methodology for assessing the impact of Restated Terms on Infraco risk and proposed that the 'in the round' test be undertaken through an assessment of the change in credit rating. However, this approach now appears less relevant, given the basis of Tube Lines' contentions.

12.9 The Arbiter therefore proposes to adopt the same start point as CEPA which is to assess "whether the Notional Infraco, acting reasonably, would see the Restated Terms as recognisably the same deal as it signed up to in the first Review Period". However, given that it is difficult to calculate the change in risk empirically, the Arbiter has undertaken a qualitative analysis of the contentions made by Tube Lines and used his judgement, supported in certain areas by the opinion of his advisers, to take a view as to whether this is recognisably the same deal as the Infraco and its funders entered into at Transfer.

12.10 The Arbiter notes the progress made by the Parties on this matter in the initial paragraph 6.5 guidance and though other contract changes. This is included in his analysis which is set out below:

[51] Material change in risk: final report, May 2008, at http://www.ppparbiter.org.uk/files/uploads/m_goodindustrypractice/2008527102810_Material_Change_in_Risk_CEPA.pdf.

Category	Tube Lines' position in June	Arbiter's view of the original contention and impact of clarification and paragraph 6.5 guidance
Closures	Tube Lines contends that both the JNP base allocation of Minor Closures and the JNP base allocation of L&E Closures are insufficient to deliver the scope. In its view this means that the scope is technically unachievable and creates the risk that its obligations cannot be met	Tube Lines has elected to refer the Base Allocation of Minor Closures to dispute resolution. Accordingly the dispute will be considered by an Adjudicator outside of the Periodic Review process. The impact of this is discussed further below
Asset Management Regime	Tube Lines contends that the changes proposed by London Underground require additional personnel and changes to systems that cannot be implemented from the start of RP2 as Tube Lines is not in a position to resource these changes until the RP2. Tube Lines contends that this creates a risk that it cannot achieve these obligations	Progress has been made on a number of items but it is understood that issues remain in relation to the materiality level to be applied to variance analysis that is now required under Schedule 3
Piccadilly Line mixed mode	As for the Asset Management Regime, Tube Lines argues that the changes proposed by London Underground are not technically achievable and create a risk that the obligations cannot be met	Although a formal contract change has not yet been notified, the Arbiter understands that this issue has been resolved between the Parties
Performance: Availability	Tube Lines contends that various changes e.g. introduction of NACHs 2014, increased abatements for 'continuing or extended sub-standard periods' and new disruption types which have no performance history are technically unachievable and create a risk that it will be unable to meet these obligations	Despite identifying some individual provisions that increased Infraco risk within the proposed Capability and Availability regimes, the Arbiter's analysis indicates that the re-calibration of Availability targets, amongst other things, provided a reduction in risk to the Notional Infraco. Hence the Arbiter concludes that there

Category	Tube Lines' position in June	Arbiter's view of the original contention and impact of clarification and paragraph 6.5 guidance
Performance: Capability	As for Availability, Tube Lines contends that changes such as revised SJTC targets on the Northern Line result in a change in risk	would not be a net increase in risk within the Capability and Availability regimes. In addition, subsequent discussions and the initial 6.5 guidance also appear to address the risks identified by Tube Lines
Other contract changes	In addition to its primary contentions set out above Tube Lines contends that the following changes also contribute to a change in risk: • tax; • Specified Rights; • Major Enhancements; • New Works cost recovery; • Olympics and Crossrail closures; • environment; • procurement; • property; • customer information; • Key Sub-contracts; • interface with Third Parties; • operational accommodation; • pensions; and • power standards.	It is understood that the several revised provisions covering the areas listed by Tube Lines have now been agreed between the Parties: While the remaining changes that Tube Lines cite as part of its contentions may in some cases increase risk, the Arbiter's analysis suggests that the impact is overstated in some areas, for example in relation to key subcontracts and specified rights. London Underground also asserts that Tube Lines fails to give due consideration to contract changes that reduce risk e.g. extension of the RP1 environmental indemnity to RP2, focussing only on changes that it considers to adverse to its risk position. Overall, the Arbiter's view is that these changes do not, in the round, constitute a material change in risk

12.11 The Arbiter's analysis is that, when taken together, the remaining unsettled elements of the drafting that support the contention made by Tube Lines do not create a material change in risk. In certain areas, such as the performance regime, the Arbiter's analysis suggests that Restated Terms reduce risk.

The implications of the current dispute on access allowances

12.12 As indicated above Tube Lines has referred the JNP Base Allocation of Minor Closures for RP2 to dispute resolution. The matter has not yet been determined.

12.13 Chapter 11 describes the analysis undertaken by the Arbiter to estimate the access that he considers would be required by a Notional Infraco in RP2. This concludes that the Base Allocation of Minor Closures is sufficient but that the Base Allocation of L&E Closures should be increased. For the purposes of his work the Arbiter has assumed that the allowances will be set as he has indicated. It follows then that the allocations proposed by London Underground in Restated Terms do not create a material change in risk.

Section 4: Initial thoughts on ISC setting and financing

13. Purpose and structure of initial thoughts

13.1 This chapter:

- sets out the Arbiter's proposed approach to ISC setting and financing issues; and
- describes the structure of this section 4.

Arbiter's proposed approach

13.2 Chapter 10 shows the Arbiter's assessment of costs and performance revenues of a Notional Infraco. As shown in chapter 14, these costs are more expensive than those on which London Underground has prepared its Affordability Constraints. In such circumstances, the PPP Agreement envisages that one anticipated outcome would be for the Notional Infraco to raise additional finance (Required Finance[52]) to bridge any affordability gap. This Required Finance would be financed (and repaid) by ISC payments in RP3 and RP4. Other ways of bridging the gap would be for London Underground to increase the amount it is willing to pay as ISC in RP2 or to reduce scope thus removing the affordability gap.

13.3 In its reference, London Underground sought a direction on the amount of Base and/or Eligible Finance required in RP2 and guidance on the level of ISC in RP2 to be confirmed through directions following receipt of advice from the FAIR in early 2010. For the reasons discussed in chapter 4, the Arbiter has concluded that he should not give such guidance, and should not give directions on finance requirements at this stage. Instead, he is setting out for consultation his initial thoughts on issues relevant to draft directions on these matters.

13.4 The draft cost directions in section 3 do not differentiate between the costs of grey assets and other assets. One of the criteria that determines whether Extra Finance is categorised between Base Finance and Eligible Finance depends on whether the expenditure required in respect of grey assets is greater than the ISC proposed by London Underground. The Arbiter will address this issue in his final cost directions if it becomes relevant.

13.5 In this section the Arbiter sets out his initial thoughts on:

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52 Required Finance is the contractual term for the total finance that Infraco reasonably requires for performance of the Restated Terms. Required Finance therefore includes existing finance and Extra Finance. Extra Finance is that amount of finance required by a Notional Infraco for the performance of its activities on or after the Review Date and comprises Base Finance and Eligible Finance. Eligible Finance is that portion of Extra Finance that a Notional Infraco would require for (amongst other things) the performance of new or varied obligations within Restated Terms. Base Finance is the remaining portion of Extra Finance that a Notional Infraco would require for the performance of base obligations which have been effective since the Transfer Date

- the overall affordability position of London Underground and its parent TfL;
- the interpretation of contractual provisions in relation to setting ISC in RP2;
- the financial capacity of the actual Infraco including any inter-creditor issues with its existing finance;
- the financial capacity of the debt markets; and
- value for money of any new finance raised.

13.6 The Arbiter is publishing in parallel with this document a draft of his Analytical Approach to calculating ISC, which sets out his proposed approach in more detail.

Structure of this section

13.7 Section 4 is structured as follows:

- chapter 14 considers affordability issues by comparing the costs set out in the draft directions and draft guidance with the Affordability Constraints set out in London Underground's Restated Terms notice of 8 December 2008; and
- chapter 15 considers financing issues and sets out the Arbiter's initial thoughts on Tube Lines' contention under paragraph 1.4(a) of Schedule 1.9 that a Notional Infraco would be unable to finance on any basis the continued and future performance of Restated Terms (modified as set out in the Statement of Case and Initial Submission).

14. Affordability issues

14.1 This chapter:

- identifies the funding gap between the costs contained in the draft directions and London Underground's Affordability Constraints;
- describes the impact of Infraco raised debt on TfL's financial settlement;
- discusses the affordability position of London Underground; and
- raises affordability issues for the Reference Parties and their Stakeholders to consider.

Funding gap

14.2 As part of its Periodic Review Notice and related instructions dated 8 December 2008 and in accordance with paragraph 2.1 of Schedule 1.9, London Underground has set out its Affordability Constraints in outturn prices. Totals for RP2, RP4 and PR4 are show in table 14.1 below.

Table 14.1: Affordability Constraints for RP2, RP3 and RP4

£m outturn	RP2	RP3	RP4	22½ year total
Baseline ISC	5,416.2	5,985.7	3,663.0	15,064.9
Capability (excluding amounts to be determined by Arbiter)	1,168.6	1,831.1	2,123.9	5,123.6
Capability (amounts to be determined by Arbiter)	56.2	33.9	39.8	129.9
Affordability Constraints	**6,641.0**	**7,850.7**	**5,826.7**	**20,318.4**
Performance Revenue	72.8	55.2	64.0	192.0
Total Performance Adjusted ISC	6,713.8	7,905.9	5,890.7	20,510.4

Source: Appendix 1a of London Underground Periodic Review Notice

14.3 In setting out its Affordability Constraints, London Underground noted that they reflected the then current estimate of the lease rentals under the proposed operating lease for new Piccadilly Line rolling stock and that the Affordability Constraints would be subject to revision if there is a change to the proposed leasing arrangements for the Piccadilly Line rolling stock or the contractual indexation mechanism. The Arbiter has not been notified of any such changes.

14.4 London Underground analysed the Affordability Constraints between its estimates of Capability payments and Baseline ISC for information purposes only. It also further split the Capability payments to show its estimate of Capability payments in excess of the cap for the Piccadilly Line Specified Line Upgrade. The Piccadilly Line capping mechanism

allows for the SJTC Caps to be amended, should the PPP Arbiter consider that a Notional Infraco could achieve a better level of performance, including early step-ups. Any of these amounts not determined to be Capability payments, would be allocated to Baseline ISC.

14.5 At the time of issuing its Periodic Review Notice, London Underground's performance estimates indicated that Availability and Ambience performance may exceed the risk adjusted benchmarks. It therefore showed its estimate of other performance payments as a memorandum to the Affordability Constraints.

14.6 By comparing the total of the relevant cashflows identified in chapter 10, having included Treasury fees[53], made allowance for inflation and added the Fixed Amounts, to the Affordability Constraints, the Arbiter has determined an initial estimate of the affordability gap for RP2 as shown in table 14.2 below.

Table 14.2: Arbiter's initial estimate of RP2 affordability gap

£m	RP2
Total costs (Feb 2008 prices)	4,394
Inflation to nominal prices	764
Add: Treasury fees	18
Add: Fixed Amounts	1,928[54]
Working capital adjustment[55]	Assumed nil
Total costs (nominal)	7,104
Less: Affordability Constraints	(6,641)
Initial estimate of affordability gap	463

Source: Arbiter's calculations

53 Within the initial paragraph 6.5 guidance the Parties have agreed that Treasury fees should be included within financing costs rather than within central costs. Whilst the Arbiter has included the initial paragraph 6.5 guidance (paper 23) figure of £17.9m for these fees in this analysis the Arbiter notes that Tube Lines has quoted a figure of £13.23m in its representations. Furthermore, the Arbiter has assumed that the agreed figure of £17.9m is in nominal prices.

54 On 1 April 2009 the Parties varied the PPP Agreement in accordance with Schedule 5.8 to adopt the Relevant Amounts produced on 7 May 2004 when Tube Lines' financial model was rerun following revised interest rate fixing after its refinancing. The Relevant Amounts included revised Fixed Amounts and the RP2 element of these is shown in the table above. On 18 June Tube Lines wrote to London Underground pointing out two discrepancies in the amounts agreed on 1 April 2009 which arise from Tube Lines' refinancing in 2004. For the purposes of this initial thoughts analysis the Arbiter has not considered these discrepancies and the issue is considered further in the Arbiter's Analytical Approach to calculating ISC.

55 As described in chapter 10, for the purposes of this analysis the Arbiter has assumed that the working capital and other adjustments required to convert the determined costs in to cashflows nets to nil over RP2.

Impact of Infraco debt on TfL's financial settlement

14.7 Table 14.2 above indicates a significant affordability gap. In anticipation of this, the PPP Agreement contains provisions for Infraco to borrow new finance as part of the Periodic Review process. However, as Tube Lines is classified as a public corporation, any new debt raised by Tube Lines would count on the public sector's balance sheet. Such borrowing would also count against TfL's financial settlement with DfT announced in February 2008[56].

14.8 The Arbiter understands this to mean that the full cost of the Tube Lines PPP needs to be afforded within TfL's financial settlement, whoever raises new finance.

Affordability position of London Underground

14.9 The stated intention of the request for guidance from London Underground on 14 April 2009 (the Initial Ranges guidance) was to help it to set its Affordability Constraints at Periodic Review. Following correspondence between himself, TfL and London Underground in Spring 2009, the Arbiter's understanding is that:

- London Underground's assessment of affordability in RP2 was based on the mid-point of the Initial Ranges numbers, adjusted for changes in Restated Terms;
- London Underground had accepted that this implied a need for further finance (potentially including equity) and, in the absence of agreement to the contrary, the PPP Agreement contained provisions in respect of Infraco raising this; and
- that TfL has discretion over its use of funds and therefore the capacity for additional finance raised by Tube Lines (or provided directly or indirectly by London Underground) to be accommodated within the TfL business plan (which incorporates the current funding settlement that TfL has with DfT.

14.10 As indicated in section 3, the draft directions on costs are within the range set out in the Initial Ranges guidance.

14.11 **In light of the previous assurances that London Underground has provided, and on the basis that the cost and performance revenues are confirmed to be as in the draft directions, the Arbiter invites London Underground and its Stakeholders to confirm that the level of costs and performance revenue payments implied by the draft directions remains affordable. If this assurance cannot be given, the Arbiter invites London Underground, pursuant to the objective in section 231(2) of the GLA Act, to review and amend the proposed obligations for RP2 in its Restated Terms, as amended by the initial paragraph 6.5 guidance.**

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56 Published at http://www.dft.gov.uk/pgr/regional/policy/lt/.

15. Financing issues

15.1 This chapter:

- sets out options for financing in RP2;
- sets out the Parties' respective positions on Tube Lines' contention of financing impossibility; and
- sets out the Arbiter's initial thoughts on the matter.

Financing options in RP2

15.2 If London Underground does not consider that it needs to descope its requirements for affordability reasons, the next issue to consider is whether TfL or Tube Lines should raise finance. As explained in chapter 14, the impact on the TfL financial settlement with DfT would be identical.

15.3 Both Parties have asserted that it would be better value for money for TfL to raise additional finance than for Tube Lines to do so. **The Arbiter would welcome further representations on whether this remains the position of the Parties.**

15.4 Issues that affect this assessment of whether Tube Lines or TfL is better placed to raise further finance include:

- inter-creditor issues with existing finance which contain provisions to protect the existing finance providers should new finance be raised alongside that finance;
- actual Infraco's current credit rating outlook, on which Standard & Poor's revised the outlook on Tube Lines (Finance) Ltd's B, C and D issue ratings to negative whilst affirming the ratings at BBB, BBB- and BB respectively on 20 November 2009. Tube Lines (Finance) Ltd's A-1 notes are rated AA- and remain on creditwatch with negative implications. S&P's negative outlook reflects concerns over the delivery of the Jubilee Line upgrade and the fact that Ambac has not being replaced as the monoline insurer following its downgrade;
- current debt markets; and
- cost of Infraco raised debt as compared to TfL raised debt.

15.5 In anticipation of these types of issues and the possible need for advice on financing impossibility, the PPP Agreement includes the concept of a financial adviser of international repute (FAIR) to be appointed jointly by the Parties but with a duty of care to the Arbiter.

15.6 On 2 October 2009 the Parties jointly appointed Royal Bank of Canada Europe Limited as the FAIR with the following key terms of reference:

- in respect of paragraph 6.4 of Schedule 1.9 to provide advice to the Parties and the Arbiter in relation to offers of finance likely to be available to Tube Lines prior to the Last Financing Date in relevant markets (including volume and terms in relation to such offers) to

finance efficient and economic performance in accordance with Good Industry Practice of the Restated Terms (based on preparation and circulation of an appropriate information memorandum (prepared by Tube Lines) to interested parties containing such information as it is reasonable for the Parties to provide and for the recipients to receive) in order for the Arbiter to receive a well founded view of the terms of offers of finance that Tube Lines may reasonably expect to be able to obtain in those markets. The Arbiter may seek clarifications from the Financial Adviser in respect of such advice and the Financial Adviser shall inform the Parties of the request and the Financial Adviser's response to such request; and

- in respect of paragraph 9.2 of Schedule 1.9, where the Arbiter has directed that Required Finance is required and/or that new or varied obligations contained in the Restated Terms involve an increase in risk for Tube Lines that is material in the context of Tube Lines' overall activities pursuant to the PPP Contract, to provide advice to the Parties (which may be made available to the Arbiter) on whether it is reasonably confident that Tube Lines has the ability on the basis of the ISC available to it (and certain other matters referred to in the PPP Contract) to procure the Required Finance prior to the Last Financing Date defined by the PPP Contract (recognising the intention is to raise this by the end of the first Review Period if possible). In providing such advice, the Financial Adviser is expected to analyse the financing plan prepared by Tube Lines, including capital structure, financing terms (including pricing), hedging and other risk mitigation strategies, and equity return, all in light of a) current market conditions, b) Tube Lines' existing financial structure, c) the Restated Terms and Tube Lines' response, and d) the proposed ISC and or other such items as may be appropriate at the time.

15.7 As noted in the timetable for this reference and consistent with the approach indicated in London Underground's Reference Application Notice, the Arbiter previously recommended that the FAIR should only get involved in the reference from the point once there is greater certainty on the affordability gap. Hence the FAIR has not been involved in the preparation of these initial thoughts.

15.8 Now that these draft directions have been published, the Arbiter considers that it would be helpful if the FAIR were to be asked to comment, with reasons, on:

- the shared assertion of the Reference Parties that TfL raised finance is better value for money that Infraco raised finance;
- given the Infraco's existing borrowing, the range of possible costs and terms of any new Infraco raised debt; and
- an initial view on Infraco's ability to raise that new debt.

15.9 **The Arbiter would welcome initial advice from the FAIR by 12 February, as an input to the draft directions on ISC and financing issues to be published on 2 March 2010.**

Financing impossibility

15.10 Tube Lines has contended within its Response to Restated Terms under paragraph 3.1(a) of Schedule 1.9 that a Notional Infraco would be incapable of financing performance of the Restated Terms on any basis. It has contended this because it considers that:

- the Restated Terms are not technically achievable; and
- the 'hard cap' approach to applying the Affordability Constraints would make it impossible for a Notional Infraco to raise the necessary finance.

15.11 The consequences of the Arbiter agreeing with a contention of financing impossibility are set out in paragraph 4.1 of Schedule 1.9 which provides that London Underground is to provide further Restated Terms which do not include the terms directed to have had the effect of causing the impossibility and the Periodic Review process starts again.

Not technically achievable

15.12 For the reasons set out in chapter 13, in relation to the contention that the Restated Terms involve a material change in risk, the Arbiter does not consider that the Restated Terms, amended by the initial paragraph 6.5 guidance and the contract changes identified by London Underground as a basis for this reference, would be technically unachievable.

15.13 Tube Lines did not withdraw its contentions in relation to financing impossibility in its representations on 17 November as it considers that the issue on closures remains outstanding pending the outcome of the Dispute Resolution Agreement process, the proposed Asset Management Regime changes are only provided by London Underground "for the purposes of the reference" and matter of performance risk is still to be resolved.

15.14 Tube Lines also argues that these issues do not need to be resolved at this stage in the Periodic Review reference process and should only be considered at the point that draft directions are to be made on financing issues in March 2010.

15.15 In its representations of 17 November, London Underground reserved the right to withdraw the concessions it had made in amending Restated Terms in the event that Tube Lines failed to withdraw its contentions.

'Hard cap' approach to applying the Affordability Constraints in RP3 and RP4

15.16 London Underground has argued that the PPP Agreement requires the Arbiter to set ISC in RP2 at the level set out in its Affordability Constraints (the 'hard cap' approach. For the reasons set out in the draft Analytical Approach to ISC setting, the Arbiter does not agree with

this interpretation of the contract. He accepts that he is required to set ISC in accordance with the shape of the Affordability Constraints profile, but considers that he is able to adjust the total (the 'soft cap' approach).

15.17 On this basis, the second limb of the contention in respect of financing impossibility drops away.

15.18 Tube Lines contended that the hard cap approach to applying the Affordability Constraints would make it impossible for a Notional Infraco to raise the necessary finance because the negative cashflows that Tube Lines will incur in the third and fourth Review Periods inevitably exceed the sum of any positive cashflows and the Affordability Constraints for those Review Periods, meaning that there is no money available in those periods to service any debt raised in the second Review Period.

15.19 The Arbiter agrees that in order for any Infraco to raise finance it must be able to satisfy lenders that that money is repayable in normal circumstances.

15.20 In its Statement of Case, London Underground disagreed with Tube Lines' argument that the hard cap approach automatically results in financing impossibility because the effect of the Arbiter agreeing with such a contention would be that London Underground has to either revisit its Restated Terms or apply one of its LUL Options thus addressing the impossibility.

15.21 Notwithstanding its point made in paragraph 15.16 above, London Underground stated in its representations dated 17 November that "to avoid any possibility of an impasse being created should the Affordability Constraints in RP3 and PR4 be insufficient to allow any such financing to be repaid, LUL has asked the Arbiter to approach the current Reference on the basis that the relevant figures are deemed increased if necessary".

Arbiter's initial thoughts on financing impossibility

15.22 Whilst recognising the future role of the FAIR in the event that Required Finance is directed in the next stage of the Periodic Review process, the Arbiter's initial thoughts on financing impossibility are that:

- for the reasons set out in chapter 12 Tube Lines' contention that the Restated Terms are technically impossible does not support its contention that finance is impossible;
- the soft cap approach to setting the ISC in RP2 removes the second part of the contention; and in any case; and
- London Underground's stated intention to relax the Affordability Constraints for the third and fourth Review Period removes Tube Lines' contention that the hard cap approach would render finance to be impossible.

Annex 1

Reference Application Notice

REFERENCE APPLICATION NOTICE

REFERENCE TO THE ARBITER
FOR
DIRECTIONS OR GUIDANCE

REFERENCE APPLICATION NOTICE

Dated: 23 September 2009

We, London Underground Limited (the Referring Party)

Wish to apply to the Arbiter for directions and guidance relating to:

(a) A direction pursuant to paragraph 1.3(b)(i) of Schedule 1.9 as to the correctness or otherwise of Infraco's contention that new or varied obligations introduced by LUL as part of Restated Terms (modified as set out in the Statement of Case and Initial Submission) involve an increase in risk which is material in the context of Infraco's overall activities. If the Arbiter considers that Infraco's contention is correct, LUL seeks guidance as to the specific changes which he considers necessary to Restated Terms to avoid this result.

(b) A direction pursuant to paragraph 1.4(a) of Schedule 1.9 as to the correctness or otherwise of Infraco's contention that a Notional Infraco would be unable to finance on any basis the continued and future performance of Restated Terms (modified as set out in the Statement of Case and Initial Submission).

(c) A direction pursuant to paragraph 1.5(a)(i) of Schedule 1.9 as to the amount and timing of the relevant cashflows, including:

   (i) the amounts of any anticipated Base Finance and/or the amounts of any Eligible Finance required; and

   (ii) the amounts (if any) included in the negative cashflows arising from the RP1 pension deficit.

(d) The Arbiter is requested to include in the direction provided under paragraph (c) a statement of:

   (i) the performance and resultant revenues the Arbiter considers would be

earned by a Notional Infraco, broken down into Capability, Availability, Ambience, Specific Project Adjustments and Service Points (as set down under Performance "P" in the OPPPA DBS), and an explanation of how each of these has been taken into account in cashflows referred to at (c) above; and

(ii) the Notional Infraco RP1 closing position.

(e) In the first instance (pending the advice of the Financial Adviser of International Repute (FAIR) pursuant to paragraph 6.4 of Schedule 1.9), guidance, and following receipt of that advice, a direction, as to the ISC to be paid by LUL from the first Review Date on the basis described in paragraph 1.5(b) of Schedule 1.9. In giving the initial guidance, if the Arbiter considers that Base Finance or Eligible Finance is required, he is requested to state an assumption as to the terms on which such finance could be raised (including as to the split between equity and debt) and give the requested guidance on this basis. If he considers that the Affordability Constraints for RP3 and RP4 are insufficient to allow all or part of the Base Finance or Eligible Finance to be raised, he is requested give the requested guidance on the basis that the Affordability Constraints for RP3 and RP4 are deemed modified to the extent necessary to avoid this result, and to state the amount of any such modifications.

(f) Guidance and/or ancillary directions (in accordance with Section 229(3)(b) of the GLA Act) (as explained in the Statement of Case and Initial Submission) as follows:

(i) guidance as to the allocation of Minor Closures and of L&E Closures which would be required by a Notional Infraco for RP2; and

(ii) a direction ancillary to the ISC direction requested at (e) above (following receipt of the advice of the FAIR) as to the amounts (if any) payable by LUL in respect of PLU 1 and 2 (PLU) and the Northern Line which have been taken into account in arriving at the determination of the ISC.

(g) In the first instance (pending the direction requested at (e) above), guidance, and subsequently, a direction, pursuant to paragraphs 1.5(c) and 1.5(d) of Schedule 1.9 as to the fixed amounts and the applicable values of RPIX.

Note: *State clearly and concisely what is being sought.*

We are applying for directions and guidance because:

Although the parties have made progress in resolving various matters since June 2009 when Tube Lines made its Response and propose continuing engagement where necessary or desirable, LUL is mindful of the timetable constraints and considers that the parties may be unable to resolve remaining issues without direction and guidance from the Arbiter.

any question on which you seek a decision by the Arbiter. Include the material facts on which you rely identifying any relevant PPP Agreements or statutory provision(s) applicable.

Attached to this Reference is: (*tick appropriate boxes*)

(i) Statement of Case ☒

(ii) Initial Submission ☒

(iii) Detailed Submission ☐

Note: *In the event that the Initial Submission is not attached to this Reference please detail the exceptional circumstances and state the date agreed by the Arbiter for its subsequent provision.*

Where there is one Referring Party:
In accordance with Article 4.3, I confirm that a copy of this Reference and any documents and information comprised or referred to in it has been provided to:

Andrew Cleaves Commercial Director Tube Lines Limited 15 Westferry Circus Canary Wharf London E14 4HD Telephone: 020 7088 4940

Telephone: 020 7088 4940
Email: andrew.cleaves@tubelines.com

Note: *Insert name and contact details of the person to whom the Reference has been sent.*

[2]I confirm that to the best of my knowledge and belief that the contents of this Reference and any documents and information comprised or referred to in it are true and accurate

Signed Dated: 23/09/09

Authorised Signatory: Sarah Atkins
Director

[3]Signed Dated:

Authorised Signatory
Director/Secretary

Address to which communications about this Reference should be sent:

Sarah Atkins
Director of Reviews and Legal
London Underground Limited
55 Broadway
London
SW1H 0BD

Telephone: 020 7918 3433
Email: sarah.atkins@tube.tfl.gov.uk

You should provide this information for the Arbiter:

1. Identity of any Responding Party, Third Party or PPP Stakeholders likely to be involved in the conduct of the Reference.

[2] *If applicable include additional confirmation relevant to statements or projections for future years as follows: "This Reference also includes statements and/or projections for future years which are given in good faith, following appropriate enquiries and on the basis of stated assumptions set out therein which assumptions are reasonably held by me/us as at the date hereof. Where those assumptions differ from those contained in the most recent AAMP and the business plans relied upon by shareholders and lenders this is made clear within the Reference or any documents and information comprised or referred to in it."*

[3] *Where another Referring Party joins in the reference it shall be at liberty to agree, disagree or express no view on all or any aspects of the Reference (see paragraph 6.5 of Schedule 1.9 to the Metronet PPP Agreements).*

2. Has the subject of this Reference or any ancillary matter or matter material to the Reference been (or is currently being) considered elsewhere in another forum and if so where?

Yes. A list of matters referred to dispute resolution under the DRA will be provided to the Arbiter and Tube Lines. In addition there exist other claims between the Reference Parties – not yet in dispute resolution – including claims in relation to Stations and the Jubilee Line Upgrade.

3. Is it intended that this Reference or any such ancillary or related matter be considered in another forum in the future?

To the extent not superseded by agreement, the contentions made by Tube Lines in its Response pursuant to paragraph 2.2 of Schedule 1.9, may be referred to dispute resolution in accordance with paragraph 4 of Schedule 1.9.

4. By what date is the Arbiter's decision requested?

Draft directions/guidance are requested by December 2009 (save where direction is requested to be provided following guidance).

Annex 2

Response to Reference

RESPONSE TO
REFERENCE TO THE ARBITER
FOR
DIRECTIONS OR GUIDANCE

Note: *Please send the completed Response to Reference to the Arbiter and the Referring Party along with your statement or other evidence referred to below. This Response to Reference and evidence is also to be submitted electronically to the Arbiter at chrisbolt@ppparbiter.org.uk*

RESPONSE TO REFERENCE NOTICE

Dated: 17 November 2009

Note: *To be a date no later than 30 days after the date of receipt of the Responding Party's copy of the Reference.**

We, Tube Lines Limited, wish to respond to the Arbiter on the terms of a Reference submitted to him by LU on 23 September 2009 for directions and guidance relating to the matters addressed in the attached Statement of Case.

We wish to respond because:

we wish to make our representations in relation to the matters that are the subject of the reference, and are doing so in accordance with the Arbiter's timetable pursuant to his decision on 5 October 2009.

The matters dealt with in this Response, and the sections of these Representations referred to in it, constitute a response only in respect of costs (again in accordance with the requirements of the Arbiter's timetable). This Response is, therefore, made without prejudice to Tube Lines' right to make further representations on other issues, in particular in respect of the ISC and financing.

Note: *Briefly set out why you are responding to the Reference for Directions or Guidance, any difference you have in regard to the nature and circumstances of the matter in dispute or upon which guidance is sought, and any question on which you seek a decision by the Arbiter. Include the material facts on which you rely identifying any relevant PPP Agreements or statutory provision applicable.*

Attached to this Response to Reference is: (tick appropriate box)

(i) Statement of Case ☑

* Tube Lines notes that the Response to Reference Template stipulates that responses should be dated no later than 30 days after the receipt of the relevant Reference. However, this Response is submitted in accordance with the Arbiter's Timetable for Periodic Review, which set a deadline of 17 November 2009 for final submissions.

(ii) Evidence in support of this application ☑

Note: *In the event that the statement or other evidence is not attached to this Response to Reference please detail the exceptional circumstances and state the date agreed by the Arbiter for its subsequent provision.*

I confirm that a copy of this Response to Reference and any documents and information comprised or referred to in it has been provided to the other Party to the PPP Agreement:

Sarah Atkins Director of Reviews and Legal London Underground Limited 55 Broadway London SW1H 0BD Telephone: 020 7918 3433 Email: sarah.atikins@tube.tfl.gov.uk

Note: *Insert name and contact details of the person to whom the reference has been sent*

I confirm that to the best of my knowledge and belief that the contents of this Response to Reference and any documents and information comprised or referred to in it are true and accurate

Signed [Andrew Cleaves] Authorised Signatory Director	Dated: 17th November 2009

Address(es) to which communications about this Reference should be sent:

Andrew Cleaves Commercial Director Tube Lines Limited 15 Westferry Circus Canary Wharf London E14 4HD Telephone: 020 7088 4940 Email: andrew.cleaves@tubelines.com

You should provide this information for the Arbiter:

1. Has the subject of this Reference or any ancillary matter or matter material to the Reference been (or is currently being) considered elsewhere in another forum and if so where?

Yes. A Notice of Dispute in relation to the technical achievability of the obligations in the Restated Terms having regard to the Closures allowances is to be served on LU on or about the date of this Response. Disputes in relation to Stations and the Jubilee Line Upgrade are the subject of proceedings under the DRA.

2. Is it intended that this Reference or any such ancillary or related matter be considered in another forum in the future?

Tube Lines has written to LU to seek clarity on its position in relation to terms which it has purported to introduce "for the purpose of the Reference" and cannot respond definitively to this question until LU has responded.