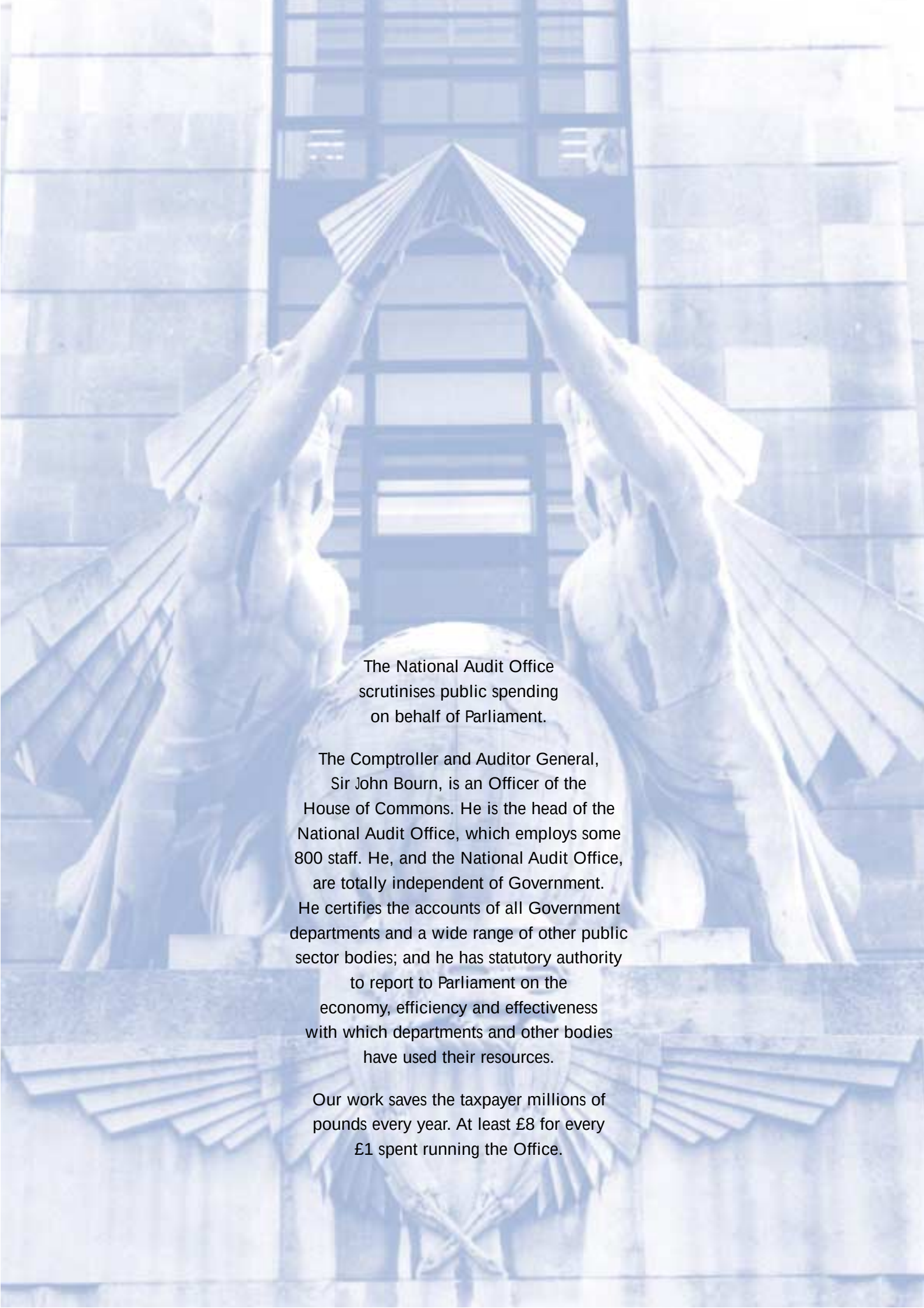
NATIONAL AUDIT OFFICE

London Underground

Are the Public Private Partnerships likely to work successfully?

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL
HC 644 Session 2003-2004: 17 June 2004



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London Underground

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LONDON: The Stationery Office
£12.25

Ordered by the
House of Commons
to be printed on 14 June 2004

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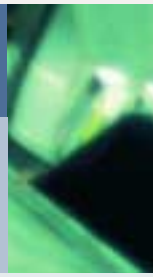

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This report has been prepared under Section 6 of the National Audit Act 1983 for presentation to the House of Commons in accordance with Section 9 of the Act.

John Bourn
Comptroller and Auditor General

National Audit Office
14 June 2004

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summary

The London Underground's three novel Public Private Partnerships (PPPs) aim to modernise the Tube. Are they likely to work successfully?

Three PPPs

1 In recent decades, London Underground (LUL) has experienced difficulties in delivering modern services for the Tube. LUL's ability to provide better infrastructure was constrained by the uneven flow of subsidy from the Treasury (due to differing success in its requests for funding at each annual spending review), which meant that long term maintenance and renewal programmes were disrupted. The effects of the funding constraint were compounded by significant cost overruns on the Central Line upgrade and the Jubilee Line Extension project (in excess of 30 per cent in each case), each completed in the 1990s, and a number of other smaller renewal programmes.[1]

2 Between December 2002 and April 2003, LUL signed three 30 year Public Private Partnership contracts (PPPs) with private sector organisations Metronet and Tube Lines. The PPPs are a joint public-private approach aimed at overcoming LUL's historical problems in financing and managing the Tube infrastructure. LUL retains the ultimate ownership and responsibility for the daily operation of trains and stations, and for safety, while the private sector partners are expected to maintain and renew infrastructure including the trains, stations, track and signalling, in a whole life manner. Using a 6 per cent discount rate, London Underground evaluated the net present value of all three PPPs over 30 years at £15.7 billion (with a value of £9.7 billion at 2002-03 prices over the first 7½ years). The Department for Transport (the Department) has agreed a stable funding regime under which it makes annual grant payments to Transport for London (TfL) to cover LUL's service charge payments, subject to ongoing monitoring and review.

Tube - Key facts

- First section opened in 1863
- 3 million passenger journeys per weekday
- 67.7 million train kilometres driven in 2003-04

3 At contract signature, Metronet and Tube Lines acquired three separate infrastructure companies (Infracos), previously wholly owned subsidiaries of LUL, covering all 12 London Underground lines, as follows:

- BCV Infraco - Bakerloo, Central, Victoria and Waterloo & City lines (run by Metronet);
- JNP Infraco - Jubilee, Northern and Piccadilly lines (run by Tube Lines); and
- SSL Infraco - District, Circle, Metropolitan, Hammersmith & City and East London lines (run by Metronet).

See **Figure 1** - Who's Who? for an understanding of the responsibilities of the key parties and how they interact with one another

Novel features

4 The PPPs are novel in a number of respects:

- The responsibility split between infrastructure and operations does not exist in any other major metro system, and has been employed in few rail systems outside the UK;
- The mechanisms to incentivise Infraco performance are more complex than those used for the vast majority of other transport systems; and
- There is a built-in periodic review mechanism that enables the parties to respecify requirements within the PPP scope and reprice the deals every 7½ years, and possibly before in certain limited circumstances.

an early assessment of the PPPs

1 *See London Underground: Final Assessment Report, February 2002; and Jubilee Line Extension Project: Post Implementation Review, Department for Transport, September 2002.*

ARE THE PPP'S LIKELY TO IMPROVE THE TUBE?

Are they likely to work successfully?

5 The NAO has to date produced two other reports about the PPPs. The first, *The financial analysis for the London Underground Public Private Partnerships*[2], found that the initial financial analysis, on its own, offered useful but incomplete insights about value for money. The key findings of our further report, *London Underground PPP: Were they good deals?*[3] *are:*

- The complexity of the PPPs resulted from the scale of the work required, the decision to have output based contracts, and limited knowledge of the condition of less accessible infrastructure;
- There is only limited assurance that the price is reasonable, reflecting the complexity of the PPPs and some uncertainty about the eventual price, but any price revisions have to meet tests of economy and efficiency and greater price certainty would have resulted in a higher price;
- The process of negotiating the PPPs took longer than expected and was costly, but on a scale consistent with the overall deal size and complexity; and
- The deals offer an improved prospect of upgraded infrastructure, compared to LUL's pre-1997 investment regime, and remedial work, that proved greater than anticipated, has been spread over a longer period than originally intended.

6 This report examines whether these deals are likely to work successfully in practice given the PPPs that were selected. To understand this we decided to undertake an early assessment of the PPPs, as they now stand, based around the following questions: i) are performance outcomes likely to improve?; ii) are the key success factors in place for the partnerships to work?; iii) are there any constraints to the success of the PPPs?

POTENTIAL FOR IMPROVEMENT, IF IMPORTANT TESTS ARE MET

A | PERFORMANCE OUTCOMES

The PPPs have the potential to deliver improvements for passengers

7 The Infracos have contracted to improve the Tube through better day-to-day performance, meeting asset condition benchmarks, asset replacement and renewal. To date, performance against benchmarks is mixed, while it will take time and good information to determine whether performance will improve to meet the full range of customer-facing contractual benchmarks. There are financial bonuses and abatements as incentives for the Infracos to deliver better performance and enable them to make significant returns on their investments, but with possible limitations in their impact.

B | SUCCESS FACTORS

Many are in place, but important tests ahead

8 In general, the deal is clearly specified and understood, and the parties are building a good partnership - which the government expects to be the most effective way to improve the Tube and, therefore, service to passengers.[4] The management of ageing assets poses serious challenges for the Infracos and it is unclear yet whether the oversight mechanisms provided for in the contracts enable LUL to deliver the outcomes to the public that are promised in the contracts. Effective contract management by all parties is essential for the full partnership benefits to be achieved.

C | CONSTRAINTS

There are limits to what the signed deals can achieve

9 The 30-year contracts are reviewed by the parties, with the assistance of an independent Arbiter (if called upon), every 7½ years but possibly before then. Therefore it is intended that the price and scope of the deals could change. Amongst other considerations, a repricing is subject to the Department agreeing to adjust the annual grant it pays to TfL for the running of the Tube. Additionally, some Tube services are provided outside the PPPs through separate PFI contracts which bring delivery and financial risks to the PPP itself. Finally, the Mayor's transport strategy for London, and the Department for Transport's actions on rail and roads in the south east will also indirectly impact upon Tube operations.

2 *HC54, Session 2000-2001, December 2000.*
3 *HC 645, Session 2004-05, June 2004.*
4 *See Were they good deals?, HC 645, Session 2004-05, June 2004, paragraphs 1.6 - 1.19 on PPP option appraisal.*

1 | Tube PPPs: Who's who?

The Tube began operations 140 years ago, initially under private ownership. From 1948 to 2002, the Tube was run exclusively by the public sector. With the signing of PPP contracts in December 2002 and April 2003, two new private sector players became involved in managing London Underground - Tube Lines and Metronet. The diagram opposite shows the relationships and interactions between the main parties involved with the PPPs.

Who runs the PPPs?

The PPPs are run through a partnership between four organisations - LUL, which is responsible for train operations and is in charge of train drivers and station staff, and the three infrastructure companies - Infraco JNP, Infraco BCV and Infraco SSL responsible for infrastructure maintenance, replacement and upgrade on specific lines and stations, as shown in the diagram opposite.

Who pays for the PPPs?

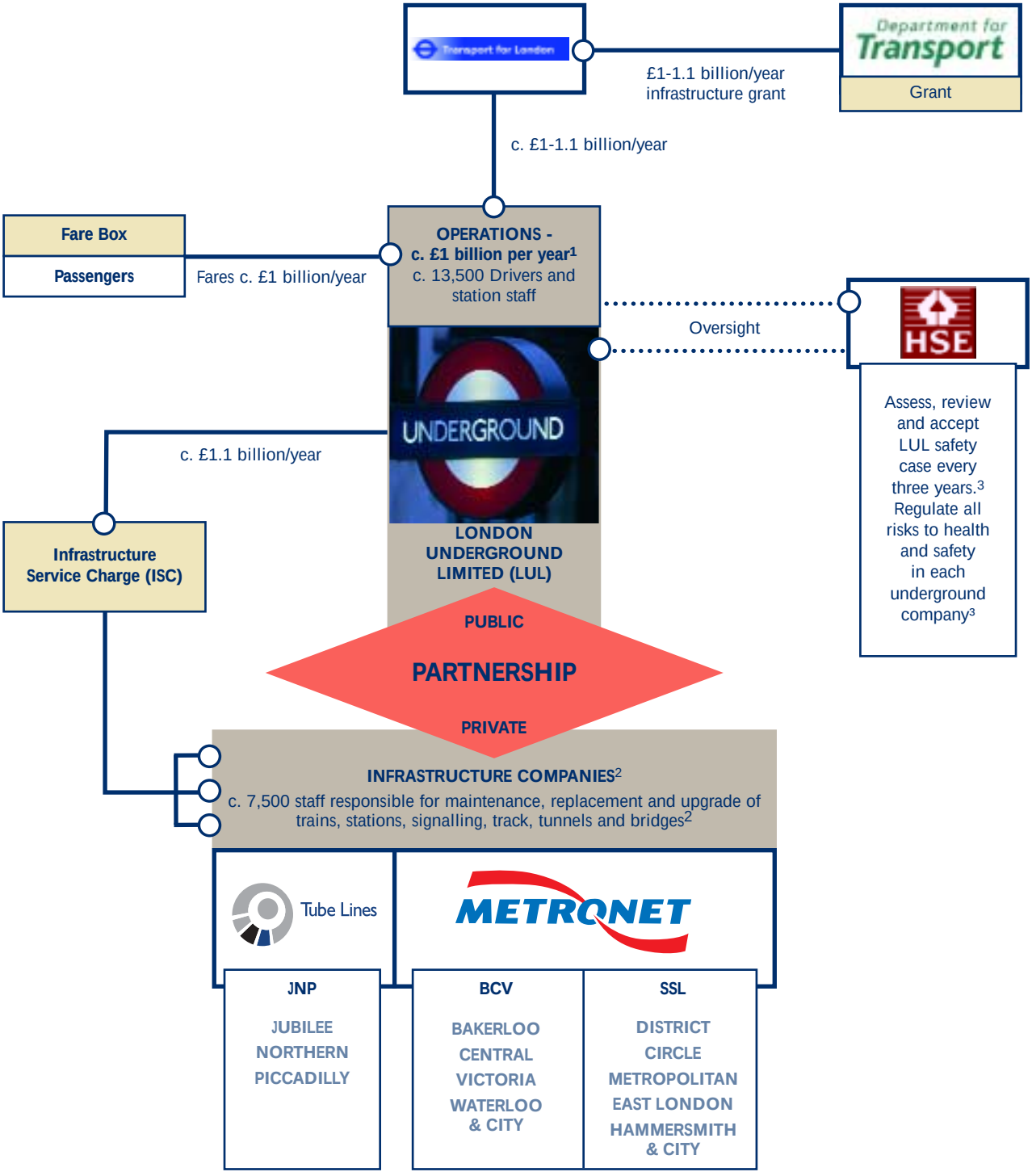
The Department for Transport provides Transport for London (TfL) with an annual grant for the Tube of some £1 billion - £1.1 billion. TfL has responsibility for London's transport system, including the Tube. LUL also receives income from passenger fares and pays the Infracos an Infrastructure Service Charge, which varies depending on performance *(see section A4)*.

Who oversees the PPPs?

The Department oversees the grant it pays to TfL for the Tube *(see B2)*, and TfL passes on the grant to LUL and monitors the effectiveness of LUL and the Infracos in running the PPPs.

Safety on the Tube is LUL's responsibility. As a train operator, LUL is required to present a three year safety case to the Health and Safety Executive (HSE). Under the PPP contracts, each Infraco must present a contractual safety case to London Underground. These take a very similar form to the safety case required by the HSE.

Tube operations and infrastructure are run through a partnership between four parties - LUL and three private infrastructure companies. They are paid through a combination of grant and farebox revenue (also see text on facing page).



NOTES

1 All monetary amounts are the most recent annual figures.

2 A Partnership Director, nominated by LUL, sits on all three infraco boards.

3 Each Infraco is required, under the PPP agreement, to present a contractual safety case to LUL.

Source: National Audit Office, derived from PPP documentation

recommendations

Whether the PPPs will deliver real benefits to passengers, and provide appropriate returns on investment, will be determined over the 30 year life of the contracts. However, there are already lessons – one year into the contracts - to be learned about deal preparation, customer needs and expectations, accountability, contract and relationship management, deal oversight, and change management.

Deal preparation

1 | Setting up a performance regime

The success of the PPPs depends to a large extent on the development of an effective performance incentive regime, which is challenging. It is therefore sensible, where possible and as in this case, to have a period of trial operation (or shadow running) to review arrangements and iron out problems. Typically, not all aspects of a regime can be fully tested ahead of time, and ongoing review is desirable. Within the Tube PPP framework, a review is anticipated at the 7½ year mark.

In introducing new performance regimes, departments should ensure that they take as full account as possible of the effectiveness of different PFI/PPP performance regimes up front. Departments should also conduct ongoing reviews of the effectiveness of the regime, including an independent audit at least one year in, on which basis changes should be made to the regime where possible. (Report reference: A1-A4 and B3)

2 | Clarity of interfaces with other contracts

LUL has a number of PFI contracts and has retained financial and delivery interface risks as between the PPPs and PFIs.

Parties setting up PPPs should take existing arrangements with third parties into account to make deals as effective as possible, with incentives to ensure smooth interfaces with existing contracts. Where this has not occurred, or is not practicable, the parties should identify the scope for remedial action as soon as possible. In this PPP, LUL and the Infracos must work together to ensure interfaces are managed successfully (Report reference: B2; C2)

Understanding customer needs and managing expectations

3 | Understanding customer needs

The key indicators of the PPP performance – availability, ambience and capability – were developed to reflect outcomes of importance to passengers. LUL collects information on the performance of the network, and uses customer surveys to establish passengers' perceptions of services, to measure PPP performance directly and for wider information and business management.

Public sector partners should develop a "whole service" understanding of the impact of the PPPs by developing or extending the scope of user surveys to ask customers whether the quality of service is meeting their expectations, and take the appropriate action in response. These surveys, which need to be used with care in tracking performance – because, for example, perceptions can change slowly and be perverse - ought to be used in performance measurement where practicable. (Report reference: A1-A4)

4 | Managing customer expectations

LUL is spending some £1 billion per year on the Tube's infrastructure. This has raised passenger expectations about service quality, yet most significant capability enhancements are not expected to happen until between 2007 and 2013.

Public bodies entering into PPPs should make clear to stakeholders – as best they can – the constraints on delivering service improvements, which in this case include previous underinvestment, affordability considerations, and alignment with other investments. (Report reference: Summary, (A1 and C1-C3)

Accountability

5 | Ensuring accountability to taxpayers

On all PPP deals, it is important that taxpayers can obtain regular and accurate information about what their money is delivering.

In this case, LUL should continue to publish clear, publicly accessible PPP contract performance outcomes information for each four week period on its website, and should consider an independent audit of this data every year to verify its accuracy. (Report reference: B4)

Contract and partnership management

6 | Developing a culture of partnership

In most instances of infrastructure problems, the parties work together quickly, and without rancour to reach operational and financial solutions. This is especially important when partners are faced with unforeseen events, such as the "extraordinary storm" of snow – an exceptional bad weather event - in January 2003.

The parties must ensure that early co-operative working becomes embedded as the way of doing things throughout the life of the contracts through various actions, such as working together to rapidly determine the root cause of problems and to determine joint solutions. (Report reference: B2)

7 | Ensuring clear attribution of risk

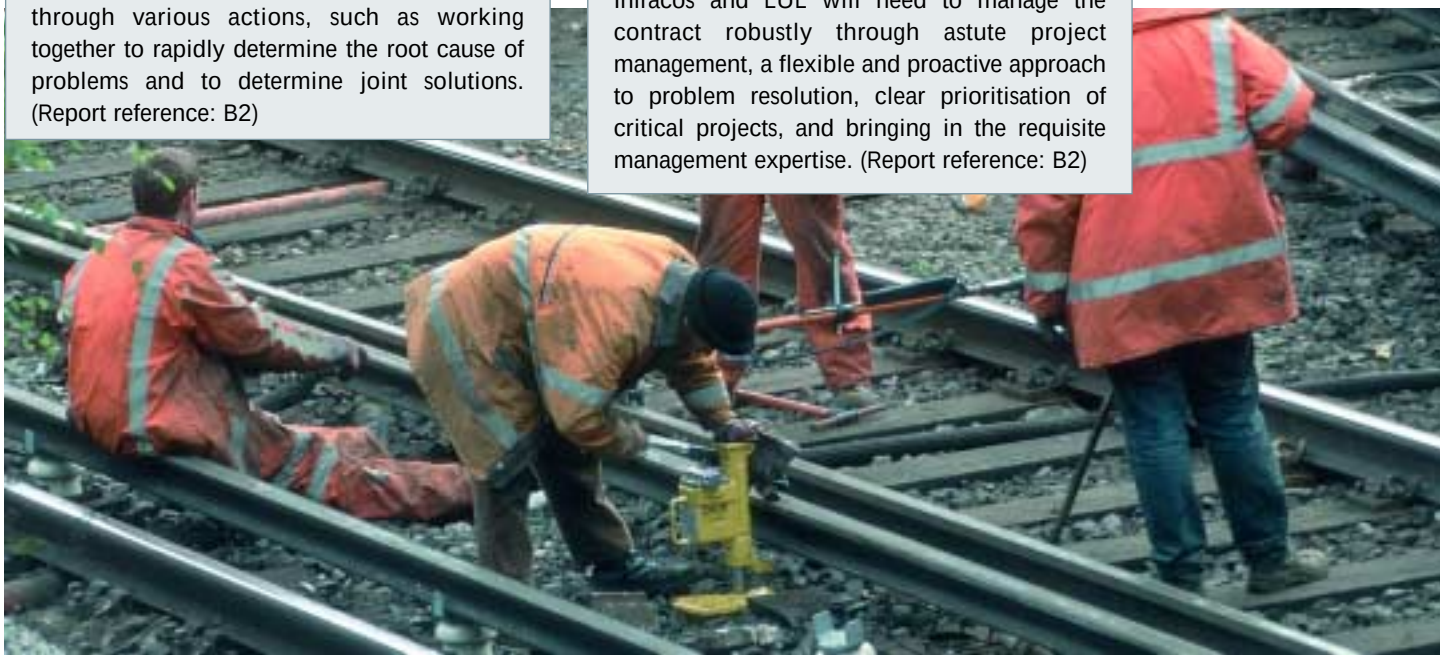
While the PPP parties are typically working together to reach swift operational and financial solutions to issues, sometimes financial resolution can take months as in the Piccadilly Line example described in Case example 6 and more generally some £14.4 million pounds of fault attribution for 2003/04 still subject to negotiation in late May 2004.

Partnership means not pursuing contractual disputes that have little merit from an outside perspective. The partners to this contract should take steps to ensure that lengthy processes to reach financial resolution continues to be the exception rather than the rule, and LUL should resolve difficulties in ways that incentivise rapid action to remedy asset condition without unduly prejudicing its financial position. (Report reference: A4; B3)

8 | Effective contract management

The effectiveness of the PPP, like that of any large contract, will depend on the parties' ability to manage the contracts effectively to deliver the expected outcomes. This will require not only an understanding of the contracts, but also developing and honing a number of key skills within both the Infraco and LUL to ensure delivery.

To deliver the expected contract outcomes, the Infracos and LUL will need to manage the contract robustly through astute project management, a flexible and proactive approach to problem resolution, clear prioritisation of critical projects, and bringing in the requisite management expertise. (Report reference: B2)



recommendations

Deal oversight

9 | Partnership Director

The introduction of a Partnership Director, nominated by Transport for London and with the same duties as other independent non-executive directors, should help foster good communications and trust between the parties. She also has a duty of care to passenger safety.

> The role of the Partnership Director should be reviewed by LUL on a regular basis. LUL should propose changes to the Shareholder's agreement that sets out the post and its functions as necessary. (Report reference: B4)

10 | Risk management

London Underground and the Department will need to follow good practice in risk management in dealing with the risk of developments relating to the PPPs that may increase central government liabilities. They should ensure that their risk management plans and processes include the full cycle of proactive activities: risk identification, evaluation of the probability and impact of risks, risk mitigation, monitoring and review.[5] LUL currently has arrangements in place for identifying and mitigating risks, particularly arising from PFI/PPP interfaces.

> The Department should avoid a complete "hands off" approach to oversight, while recognising that the partners must have freedom to deliver their responsibilities under the contract. (Report reference: B4)

5 *See previous NAO reports such as Risk Management: The Nuclear Liabilities of British Energy, HC 264, Session 2003-04, 6 February 2004, and Risk Management Assessment Framework, HM Treasury, June 2003.*

Change management

11 | Managing scope changes ahead of 7½ year Periodic review

The PPP contracts are intended to incentivise the Infracos to deliver the works necessary to meet the obligations described in the contracts. But they also allow LUL the option to require an Infraco to deliver a range of additional works for which the Infraco – or possibly an alternative provider in the case of a major enhancement - is entitled to payment. LUL is finding that some additional works are more costly than they anticipated, and that the market for alternative providers is limited.

It is sensible that the contracts allow for possible scope changes, but LUL must maintain its knowledge base and benchmark the private Infraco proposals to check that they offer additional works at a fair price. More generally, Departments should ensure that the review mechanisms in PFI/PPP deals secure the commitment of the private sector to its long term responsibilities. (Report reference: B2 and C1)

12 | Preparing for 7½ year Periodic review

A service procurer needs a good knowledge of the supply market to assess the value for money of future work. This is hard given limited suppliers, and possible reduced transparency on Metronet's side, where major suppliers are part of the consortium. LUL report that initial information to date from the Infracos is inconsistent and, in some cases, inadequate.

If partnership is to work, LUL needs to be given accurate, consistent, and regular information from each Infraco. The level of detail about disaggregated costs should be no less than during the original PPP bid evaluation stage to permit sound judgement about whether the re-pricing at 7½ year review represents good value for money. (Report reference: A3.4; C1)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A | PERFORMANCE OUTCOMES

It is early days, but the PPPs have the potential to deliver improvements for passengers

A1 The Infracos have contracted to improve the Tube, in accordance with a series of contractual performance targets

The infrastructure companies (Infracos) are tasked with improving the Tube infrastructure. But the contracts span 30 years. Are the Infracos likely to deliver real improvements for passengers?

AVAILABILITY

AMBIENCE

FAULT RECTIFICATION

A1.1 | Better asset availability, ambience and fault repair

Under the PPPs, there are three key indicators of day-to-day performance, on which basis LUL adds bonuses or makes deductions to the Infrastructure Service Charge that it pays to the Infracos (see A4 for more on the financial consequences of performance). These indicators focus on outcomes that a passenger experiences:

- **Availability** – a measure of asset reliability that takes into account disruptions to passenger service. It is assessed in terms of Lost Customer Hours and reflects the type of service disruption, location, day of the week, and time of day. For example, defective trains and escalators at rush hour mean that customers "lose" time due to delays.
- **Ambience** on trains and at stations – the quality of the passenger's environment, including cleanliness, quality of ride, and the general condition of stations and trains. It is assessed by "mystery" shoppers, who rate each element of the ambience environment to produce an overall score out of a possible 100. Examples of planned improvements include: all Metronet stations are to be modernised during the contract period, 30 in the first period and 3 in the second, and refurbished every 7½ years; and graffiti will be removed within 24 hours of each incident; Tube Lines is embarking on a similar programme of station modernisations and refurbishments, and all Infracos are seeking to improve train cleanliness by implementing "deep cleans" more frequently than in the past.
- The speed and quality of **fault rectification** – for example, fixing faults with trains, lighting, pumps and drains. Faults must be fixed within standard clearance times. To illustrate, litter and spillages must be removed within one hour.

A1.2 | Improved asset condition

The Infracos are required contractually to recover shortfalls in the condition of the Tube infrastructure arising from an acknowledged backlog of investment. The assets must reach "steady state" condition by 2026, based on the assumption that it will take this long to remove the backlog. In reaching "steady state", the Infracos must:

- Monitor and report on the condition of their assets – in accordance with benchmarks, on a scale from A to E.[6] LUL is to assure itself that Infraco asset management regimes are effective and appropriate, and to measure progress between and at each 7½ year periodic review against a) asset condition benchmarks (for stations, tunnels, etc.) and b) residual life benchmarks (for renewable assets such as trains and escalators).
- Develop annual asset management plans – looking nine years ahead and setting out what an Infraco proposes to do to implement its asset management strategy and meet its contractual obligations.

most enhancements are expected to be delivered between 2007 & 2015

6 *Conditions A, B and C are satisfactory or better, Condition D demands heavy maintenance or replacement/overhaul, Condition E demands frequent inspection or removal from service until fixed.*

A1.3 | Asset upgrades and renewals

Infraco performance on upgrades and renewals is measured in terms of asset capability, which is the best practical journey time that can be achieved from the rolling stock, signals and track assets. The best practical journey time is the average total journey time a customer will experience, including platform waiting time and "on the train" time from arrival to destination, expressed in minutes. **Figure 2** illustrates the improvements to capability that the Infracos have contracted to deliver for passengers over the life of the PPPs. Most enhancements are expected to be delivered between 2007 and 2015.

A1.4 | While meeting LUL standards

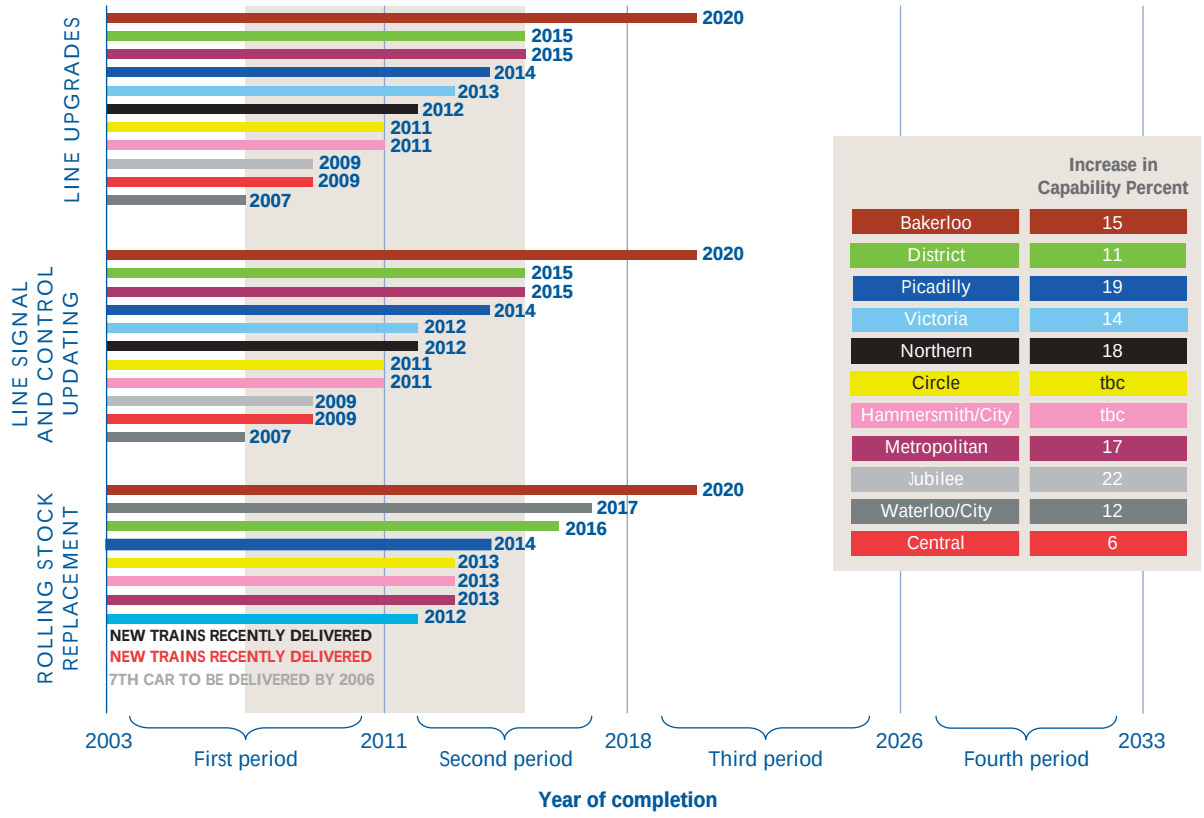
In delivering against these commitments, the Infracos must meet a variety of standards, covering such areas as:

- safety;
- environment; and
- interfaces and interoperability.

Appendix 2 provides an illustration of how these standards fit into the overall incentive regime that LUL monitors Infraco progress against.

2 INFRACO CAPABILITY PROMISES

The private infracos have promised to deliver capability improvements across the Tube network, with most enhancements – partial and full upgrades - scheduled to be completed between 2007 and 2015.



Note

The coloured bars show the "latest implementation dates" by which extra capability is to be delivered on each line. The infracos determine when they carry out the work programme.

Source: National Audit Office, derives from LUL documentation

A2 In the first year of the PPPs, performance against contractual benchmarks is mixed

The Infracos must meet various contractual performance targets. The PPPs began a year ago. Has performance improved in the early days of the PPPs?

A2.1 | Availability was uneven in the first year, with mixed performance against contractual benchmarks

The PPPs began in early 2003. But between September 1999 and April 2003 (December 2002 for JNP Infraco), there was a period of "shadow running" of the PPPs (see boxed text). Availability performance during shadow running was highly volatile, above and below benchmark. This was caused largely by the introduction of new trains (Northern Line) and track (Jubilee Line), which improved availability after a bedding in period (the "j-curve" effect - an initial drop in reliability due to integration problems, followed by a steady improvement as these issues are resolved); a high number of Temporary Speed Restrictions, which were instituted for safety reasons.

Performance remained uneven in the first year of the PPPs, above and below benchmark. As **Figure 3** shows, between April 2003 and March 2004, total agreed Lost Customer Hours were 16.97 million, which is better than the Department's target - derived from the sum of the benchmark values in the contracts - of 18.62 million. While the Infracos collectively met the Department's target for Lost Customer Hours, two of the three Infracos performed slightly worse than overall benchmark and a significant amount of service disruption was still to be agreed as at mid-May 2004 (see Section A4.3). Although some bedding-in is to be expected, TfL is of the view that this level of performance is disappointing. Performance data on individual lines is set out at Appendix 3, and shows that volatility was particularly pronounced for Jubilee, Northern and Piccadilly lines. When the investment backlog is further reduced, the parties expect availability scores to improve, with less fluctuation, and underlying asset failure rates (which LUL monitors, but which are not part of the contractual targets) to improve.

Shadow running was a three year period preceding the signing of the PPP deals during which the PPP framework was trialled and modified. LUL was split into separate operating and infrastructure companies, although service payments and payment deductions between the companies were notional rather than real.

3 EARLY AVAILABILITY PERFORMANCE UNDER THE PPPS (APRIL 2003 - MARCH 2004)

Agreed availability performance (measured in Lost Customer Hours) in the first year is better than the total contractual benchmark, although there is variation between Infracos and responsibility for some £14.4 million worth of service disruptions still to be assigned as at mid-May 2004 - see Section A4.3. These disruptions, if agreed in LUL's favour, could materially change overall availability performance.

	Agreed Lost Customer Hours (millions)	Benchmark Lost Customer Hours (millions)	Variance (millions)	Achieving benchmark? (provisionally)
Infraco BCV	5.65	5.28	+ 0.37	No
Infraco SSL	6.47	8.68	- 2.21	Yes
Infraco JNP	4.85	4.66	+0.19	No
Total	**16.97**	**18.62**	**- 1.65**	**Yes**

Source: London Underground Limited

so far, performance is mixed

A2

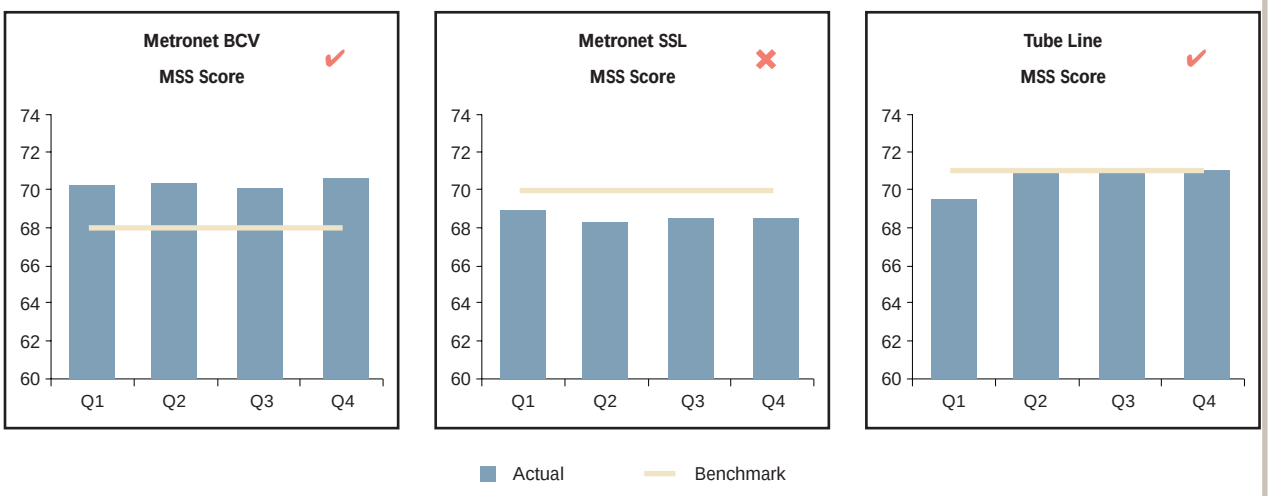
A2.2 | In the first year, two of the three Infracos achieved benchmark performance for ambience

During shadow running, there was a gradual worsening in ambience scores. On the JNP lines, for example, ambience scores fell from 71 out of 100 in late 1999 to 67 out of 100 in late 2002. This kind of performance was mirrored on other lines and was caused primarily by delayed investment in the cleaning and repair of stations and trains while the contracts were being finalised. As **Figure 4** shows, in the first year of the PPPs, ambience scores are improving though not yet to a statistically significant degree. Two of the three Infracos are currently achieving benchmark performance. LUL attribute the better than benchmark scores for BCV Infraco to additional cleaning of Central Line trains during the three month line closure that followed the derailment in January 2003 at Chancery Lane, and benchmark performance for JNP Infraco through actions such as an intensive programme of train deep cleaning and the establishment of dedicated graffiti removal teams. Scores for SSL Infraco are worse than target, although LUL anticipates that deep cleans of trains and a commitment to remove all non-scratch graffiti within 24 hours will raise SSL's score to better than benchmark.

The parties anticipate that, even in a worst case scenario, ambience should at least equate to benchmark. For example, in the first 7½ years for JNP Infraco the best and worst case scenarios (as per its bid) are as follows: best case - ambience scores reach 79, 11 per cent above benchmark, within 5 years of the start of the contract; worst case - ambience scores meet benchmark of 71 within 2 years of the start of the contract.

4 EARLY AMBIENCE PERFORMANCE UNDER THE PPPs (April 2003 - March 2004)

In the first year, two of the three infracos achieved benchmark performance for ambience.



Note

1 *Ambience measured through a quarterly Mystery Shopping Survey(MSS)*

2 *The Infrastructure Service Charge that LUL pays to the infracos is reduced for worse than benchmark performance, and LUL pays bonuses for above benchmark performance. See A4 for more on financial incentives*

Source: London Underground Limited

A2.3 | Early fault rectification performance is generally better than threshold

During shadow running, accrued fault rectification - the speed and quality of asset and facilities fault repair - was very volatile and therefore making any forward comparisons is difficult. As **Figure 5** shows, in the first year of the PPPs (April 2003 to March 2004), fault rectification scores are more stable, and compare well against the thresholds allowed for in the contracts. Asset fault rectification performance from April 2003 to March 2004 was much better than the threshold beyond which abatements are paid for all Infracos, while facilities fault rectification across the same period was worse than threshold for Infraco BCV and Infraco JNP and better than threshold for Infraco BCV.

5 EARLY FAULT RECTIFICATION PERFORMANCE UNDER THE PPPS (2003/04)

Fault rectification performance in the first year is, on the whole, better than threshold, although LUL believe performance on customer - facing assets gives some cause for concern.

	Infraco BCV	Infraco SSL	Infraco JNP
Asset faults The failure of non-customer facing assets, and faults not rectified within standard clearance times	**Better than threshold**	**Better than threshold**	**Better than threshold**
Facilities fault rectification The failure of customer facing assets, such as a public address system	**Worse than threshold** *Primarily due to CCTV, public address and toilets problems*	**Better than threshold**	**Worse than threshold** *Primarily due to CCTV failures*

Note

The Infrastructure Service Charge that LUL pays to the Infracos is reduced for worse than threshold performance.

Source: London Underground Limited

A3 It will take time, and good information, to determine performance against the full range of contractual targets

The Infracos must also meet longer term performance benchmarks for asset upgrade and renewal, while ensuring the assets reach a "steady state" by 2026. Is performance in these areas any better now that the PPPs are in operation?

A3.1 | Contractual targets for improved asset capability and health involve deliverables many years into the future

It is too early to confirm to what extent improved capability will be delivered under the PPPs by the contractual dates because most upgrade work will not be completed for a number of years. However, the minimum capability enhancements that the Infracos must deliver represent an overall capacity increase of 12 per cent by 2011. In the first 7½ years, only a limited amount of capability upgrade work is expected to occur - for instance, the interim line upgrades on the Central and Victoria lines which are expected to be delivered by 2009.

As referenced in A1.2, the Infracos must also ensure that assets reach a "steady state" condition by 2026.

A3.2 | There is some information on progress with asset capability and health improvement projects, with room for improvement in the quality and quantity of information sharing

The parties recognise the importance of establishing and meeting interim milestones on the way to delivering better performance in the long run. TfL adopted this kind of approach to the PFI contract for the new "Oyster" card that passengers started using in January 2004. TfL and the contractor, Prestige, agreed confidence building milestones such as the development of a staggered launch in the months leading up to full launch, which avoided what TfL describes as a "Christmas Tree" scenario involving a one-time, annual flick of the switch and a hunt for the failed bulb.

need to manage the risks successfully

The parties report the following progress towards delivery on longer term projects:

- The Infracos are meeting initial milestones for placement of work with sub-contractors - For example, between June and October 2003, Tube Lines awarded a £100 million contract to Alstom to add a seventh carriage for all Jubilee Line trains, a £150 million contract to Grantrail - Trackwork for track replacement and refurbishment across all JNP lines, and a £300 million contract to Alcatel for new signalling systems on all of the JNP lines.
- The first asset condition assessment was completed in December 2003
- Annual asset management plans are being delivered - Tube Lines delivered its annual asset management plan on schedule in January 2004, and Metronet delivered its equivalent plan on schedule in March 2004.
- A full asset register, required two years into the contract, is on track.
- By September 2004, the Infracos have committed to provide data for a Master Projects Database that LUL can use to assess progress on capital projects.

LUL reports that information provided by the Infracos to date is of an inconsistent quality and level of detail. For example, Metronet is providing sub-contract information to LUL, and in early 2004 agreed to copy what Metronet considers to be material variations to LUL. There is, as yet, no agreement with Tube Lines over the provision of information on material variations to LUL, although Tube Lines maintains that it complies with all requirements that were envisaged at deal close and will provide confidential information to the Arbiter (see Section C1). LUL has other concerns, including the fact that they do not yet have visibility over whether the Infracos are spending on maintenance economically and effectively, or the extent to which they are using their contingency allowances - an allowance that the Infraco made for risk but was unable to quantify and allocate specifically at the bid stage. It is difficult to monitor the drawdown of risk funds, as the contingency sum that was separate during bid evaluation has been aggregated into Infraco general budgets.

A3.3 | Delivering better capability will involve risks, and associated costs that may be borne partly by LUL

The delivery of better capability across the life of the contracts will depend on whether the Infracos manage successfully the risks involved in completing the line upgrades and renewals. One such risk is the intention to move to new transmission based signalling systems on each of the Jubilee, Northern and Piccadilly lines. An ambitious technological advance involving the adoption of moving block signalling proved not to be possible for the earlier, pre-PPP Jubilee Line Extension project and contributed to the £1.4 billion of cost overruns (at outturn prices), or 67 per cent more than the original cost estimate, and time delays on the project of almost 2 years. Tube Lines acknowledge the need to manage the risks of introducing new technologies and if it can demonstrate that it has behaved "economically and efficiently" then additional costs to deliver over a threshold will be borne by LUL.

Figure 6 shows how key risks are allocated under the contracts. Infraco liabilities are capped if they experience significant cost overruns while operating "economically and efficiently" - see Section C1 for more on this.

6 ALLOCATION OF KEY RISKS UNDER THE PPP'S

	Risk	LUL	Infraco	Shared
Revenue:	From passenger demand	✔		
	From meeting performance targets		✔	
Safety:	In passenger operations (e.g. driving at the appropriate speed); change of safety law	✔		
	In the provision of assets that are "fit for purpose", with As Low as Reasonably Practical risk		✔	
Costs:	Of infrastructure work, e.g. design and construction of new trains		✔*	
	Of operations, e.g. cost of drivers	✔		
	Of inflation (indexed)			✔
	Of rectifying the health of unclassified, "grey" assets (e.g. deep tunnels)			✔

Note

Net cost/revenue overruns are capped at £200m for Infraco JNP in the first 7½ years and £50m for Infraco BCV and SSL if the Infraco is acting in an "economic and efficient" way - see C1 for more on this.

Source: National Audit Office, derived from PPP documentation

A4 There are financial incentives to deliver better performance, but possible limitations in their impact

It is early days in the PPPs, but are there appropriate financial incentives in place to ensure that the Infracos deliver better Tube performance across the life of the contracts?

Infraco deliverables are specified such that the Infraco suffers payment abatements if it does not deliver a satisfactory level of performance, and receives payment bonuses if it achieves performance higher than benchmark. **Figure 9** sets out how achieved performance against the main performance indicators affects the Infrastructure Service Charge that LUL pays to the Infracos, and hence rates of return that the Infracos will make.

A4.1 | There are financial incentives for the Infracos to deliver capability upgrades

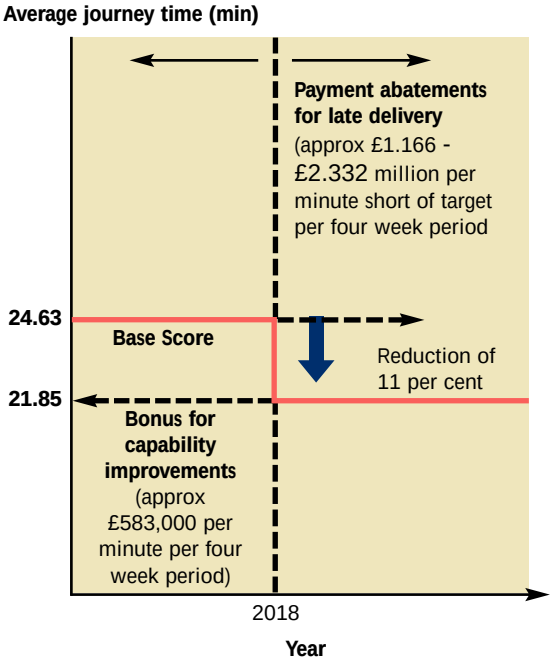
The Infraco finances the services and works that are required for improved capability, and receives payments according to the level of performance that they achieve. The Infraco is incentivised to deliver capability upgrades by specific dates. If these dates are not met, abatements will be incurred by the Infraco **(see Figure 7)**.

A4.2 | There are incentives for the Infracos to deliver better day-to-day passenger service

Over time, the Infracos need to meet progressively more difficult benchmarks of lower Lost Customer Hours (LCH), while the ambience benchmark remains constant in line with the expected delivery of station modernisations. **Figure 8** shows how availability performance is incentivised, with payment deductions twice the amount of bonuses for the same amount of variation from benchmark.

7 ASSET CAPABILITY INCENTIVES

The Infracos must deliver higher capability by certain dates, or else incur payment abatements. The chart below shows how the incentives are intended to encourage timely delivery of a line upgrade on the District Line.

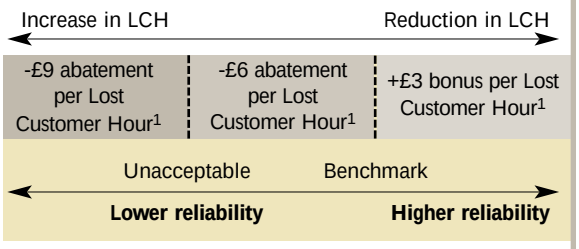


Note

Figure does not show two smaller capability upgrades - of 1.6 per cent and 2.6 per cent of the base score, which must be delivered by 2012 and 2015 respectively.

8 INCENTIVES TO IMPROVE AVAILABILITY

Bonuses and abatements are incurred at different levels



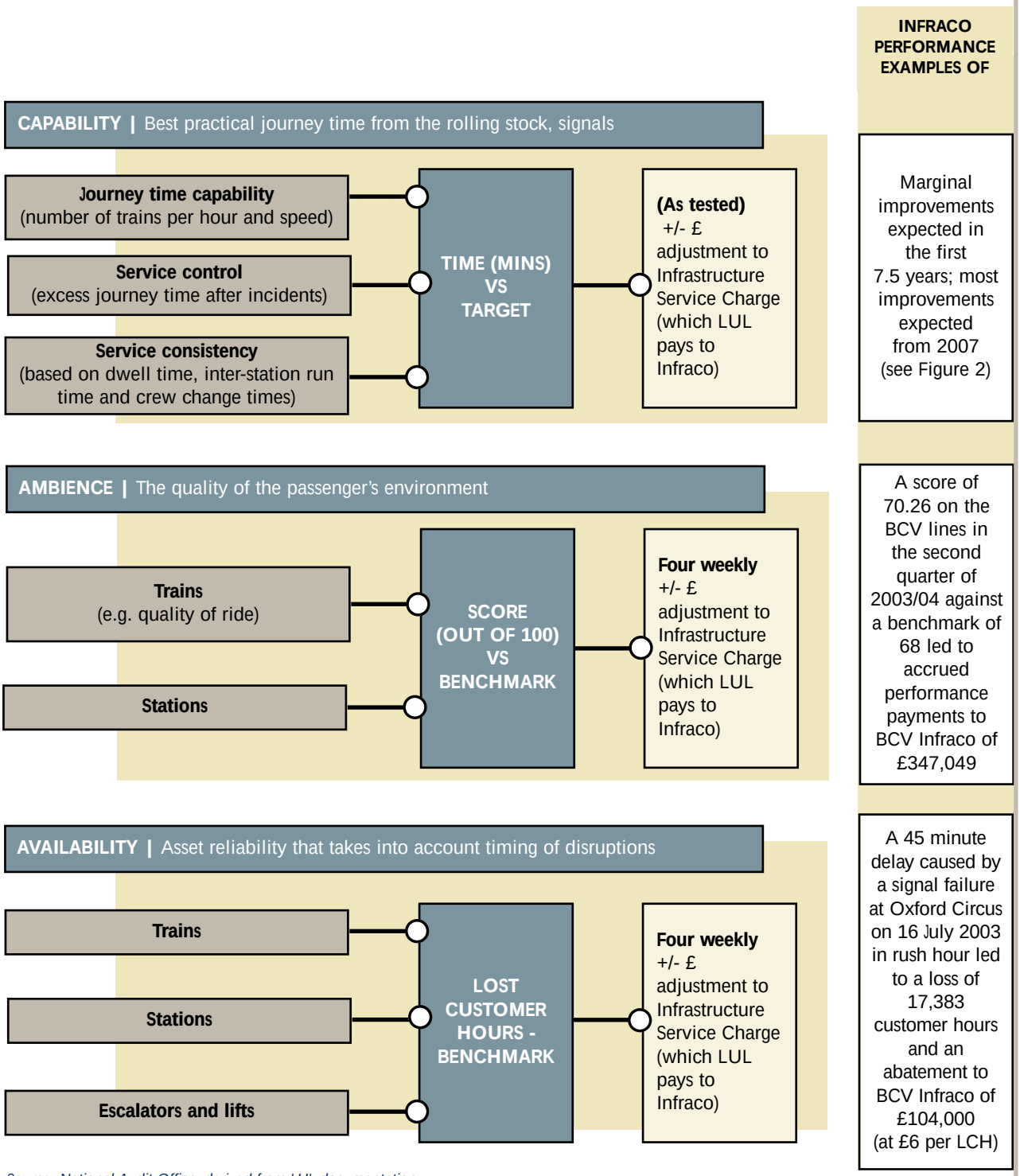
Note

1 Overall abatements/bonuses are determined every four weeks

Source: National Audit Office, derived from LUL documentation

9 TUBE PPPS: KEY PERFORMANCE MEASURES AND PAYMENTS

Infraco performance is measured against a range of mainly outcome-specified indicators, and LUL's service charge payments to the Infracos are adjusted according to performance



Source: National Audit Office, derived from LUL documentation

A4

A4.3 | In the first year, performance payments to the Infracos are, as expected, small in comparison to the overall service charges

In their bids, the Infracos estimated that their net performance payments in the first year would range from -£10.4 million (Infraco JNP) to +£4.9 million (Infraco SSL). In all cases, the Infraco anticipated that net performance payments/abatements would not exceed 3 per cent of the overall Infrastructure Service Charge, reflecting the fact that the impact of capability upgrade incentives does not kick in until later periods when major upgrade projects are expected to be delivered. As **Figure 10** shows, net payments/abatements in the first year are in line with Infraco expectations, with a worst case total - assuming all payments/abatements that remain to be agreed all go in LUL's favour - of a net total 2 per cent deduction from the Infrastructure Service Charge across the three Infracos.

A4.4 | The effectiveness of incentives is unproven

There are potential limitations to the impact of these incentives because:

- As **Figure 10** demonstrates, the incentives impact the Infracos only at the margins of their profitability and it is therefore difficult to determine the extent to which they impact Infraco shareholder behaviour. However, according to the LUL and Infraco staff we spoke to, they are having some impact at a middle management level.
- The PPPs are intended to deliver private sector innovation (see Section B2.5), but there is no guarantee that the performance regime will encourage the use of innovative processes or delivery of innovative products by the Infracos.
- Contractual performance targets, while adjusted during shadow running,[7] do not remove all historical volatility. We therefore find it hard to determine whether they are easy or

10 EARLY SERVICE CHARGE PAYMENTS TO THE INFRACOS

Net payments/abatements for Infraco performance in the first year of the PPPs are in line with Infraco expectations, and will reach a maximum of 2 per cent of the overall Infrastructure Service Charge

2003-2004	Infrastructure service charge (paid)[1] £m	Bonus (paid)[1] £m	Abatement (paid)[1] £m	Payment/ abatement to be agreed[1] £m	Bonus/ Abatement Out-turn Range - Net £m	Infraco bid forecast[2] Bonus/ Abatement - Net £m	Difference between outturn and Infraco bid - Net £m
BCV	333	+1.6	-3.0	-4.9	-1.4 to -6.3	-4.0	+2.6 to -2.3
SSL	385	+5.4	-2.5	-1.1	+2.9 to +1.8	+4.9	-2.0 to -3.1
JNP	356	+0.5	-8.1	-8.4	-7.6 to -16.0	-10.4	+2.8 to -5.6
Total	**1,074**	**+7.5 (0.7%)**	**-13.6 (1.3%)**	**-14.4**	**-6.1 to -20.5 (0.6 to 1.9%)**	**-9.5**	**+3.4 to -11.0**

Notes

1 *The figures quoted in the table are derived from 2003/04 Infrastructure Service Charge invoices that LUL had received from the Infracos, and agreed, at May 2004. The bonus and abatement numbers exclude performance payments and abatements resulting from cancelled or delayed access - see case example 5 for more on this.*

2 *Forecast for performance as per bidder's final financial models, against which the parties assess the Infraco's planned performance.*

Source: London Underground Limited

7 *See Were they Good Deals?, HC 645, Session 2004:05, June 2004.*

difficult to achieve, and whether they are sufficiently aggressive, although there is always a marginal return for improving performance.

- Tests during shadow running showed a strong correlation between spending on ambience and improved ambience scores, but for availability the relationship between investment and outcome is less clear.
- The availability measure becomes more difficult to achieve over time, but operates in isolation from other measures. Therefore, the impact of a capability enhancement on service availability - positive (e.g. due to less signal delays) or negative (e.g. more customers) - is not directly taken into account in the benchmark.
- LUL can issue corrective action notices for poor performance but although these require the Infraco to undertake - and fund - the necessary corrective action, they do not carry a direct financial penalty. However, the reputation of the Infracos is at stake and there may be adverse financial implications for them, for example with lenders, if they perform poorly. The contractual procedures in this situation are as follows:

SERVICE CHARGE ADJUSTMENTS

LUL decreases Infrastructure Service Charge payments if performance does not meet benchmark

CORRECTIVE ACTION NOTICES

In case of persistent poor performance, LUL can issue improvement notices to the Infraco concerned (or ask the Arbiter for an Extraordinary Review - see Section C1)

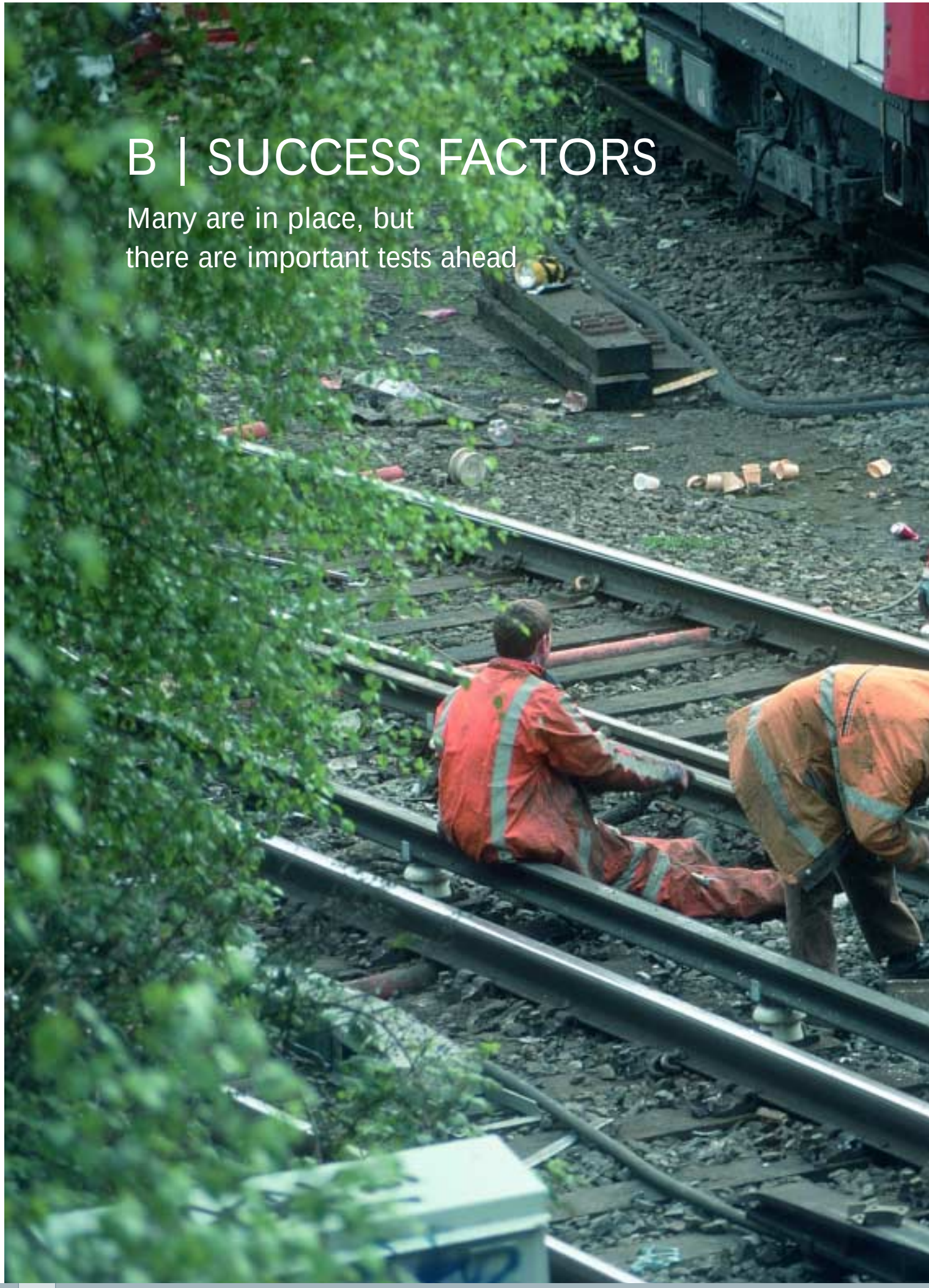
STEP-IN RIGHTS

LUL can step in to remedy the problem, or can ask another Infraco or a third party to do so. LUL or the party stepping in on its behalf must act in accordance with Good Industry Practice during any step-in

MANDATORY SALE

LUL can enact a sale:

- If the Infraco has not remedied a Warning Notice Within a period needed by an Infraco acting economically and efficiently and giving high priority to remedial action
- If LUL has stepped into Infraco obligations for over a year
- If a prohibited act or safety breach has occurred, which the Infraco has not remedied
- In certain circumstances relating to the Stand Still Agreement



B | SUCCESS FACTORS

Many are in place, but there are important tests ahead

B1 The deals are generally well specified and understood

B1.1 | Input responsibilities are clear

The main inputs to the PPPs are funding, staffing and assets. These responsibilities are clearly set out in the contracts and associated documentation:

- Funding – in the first 7½ years of the contracts, LUL expect to pay some £9 billion in Infrastructure Service Charge (ISC) payments to the Infracos, including performance payments, and up to £680 million for major enhancements (at 2002-03 prices). These payments are guaranteed by TfL and will be met by:
  - net operating revenue of £0.1-0.3 billion/year (farebox revenue less LUL operating costs); and
  - a grant from the Department to TfL of some £1-1.1billion per year **(see Figure 11)**.

  The ISC for later periods is agreed by the parties, with help from the Arbiter, at 7½ years - see Section C1.

11 THE DEPARTMENT'S ESTIMATED ANNUAL INFRASTRUCTURE GRANT TO TFL

Year	£ million (cash equivalent)
2002/03	930
2003/04	984
2004/05	1,019
2005/06	1,104
2006/07	1,131
2007/08	1,188
2008/09	1,218
2009/10	1,308
Total	8,882

Source: Department for Transport

- Staffing – At deal signature, around 7,500 infrastructure staff were transferred from LUL to the private sector Infracos. Some 13,500 operational staff, including train drivers and station staff, remain part of LUL. Staffing at senior management level has changed significantly since the contracts were signed - when LUL ownership transferred to TfL in July 2003, a new management team and management structure was established; meanwhile, a number of the senior management roles at the infracos are now undertaken by secondees from the shareholding companies, the goal being to bring new perspectives and expertise to the original staff base.
- Assets – the condition and life expectancy of the Tube's main assets (trains, stations, etc.) are the responsibility of the Infracos. However, some assets such as power supply and the LUL property estate are not managed through the PPPs, but remain under the control of LUL - see Section C2.

The PPP contracts place obligations on each partner. But there are thousands of obligations in the contracts. Are the parties clear about their responsibilities?

B1.2 | Key contract management obligations are explicitly stated

The major contract management responsibilities that the parties must assume are explicitly stated in the contracts and are, to some extent, tested. They include:

- Fault attribution and dispute resolution – the process for attributing responsibility to faults and resolving disagreements is detailed in the contracts (*see Figure 11*). The process was operational during shadow running and therefore the parties at various levels gained experience of how the process is supposed to work, though with notional rather than real assignment of payment deductions for the Infracos. The parties have also had one year's experience of using the system for real since the PPPs were signed.
- Contract changes - LUL has limited rights to vary the scope of the PPP contracts so as to require the provision of additional pre-determined assets and/or services from the Infracos such as air conditioning on SSL trains (*see Case example 3 on page 36 - Scope changes*).

An important factor in successful management of the PPP contracts will be the co-ordination of interfaces with other PFI contracts and national rail operations - see sections C2 and C3.

B1.3 | Deliverables are generally clear

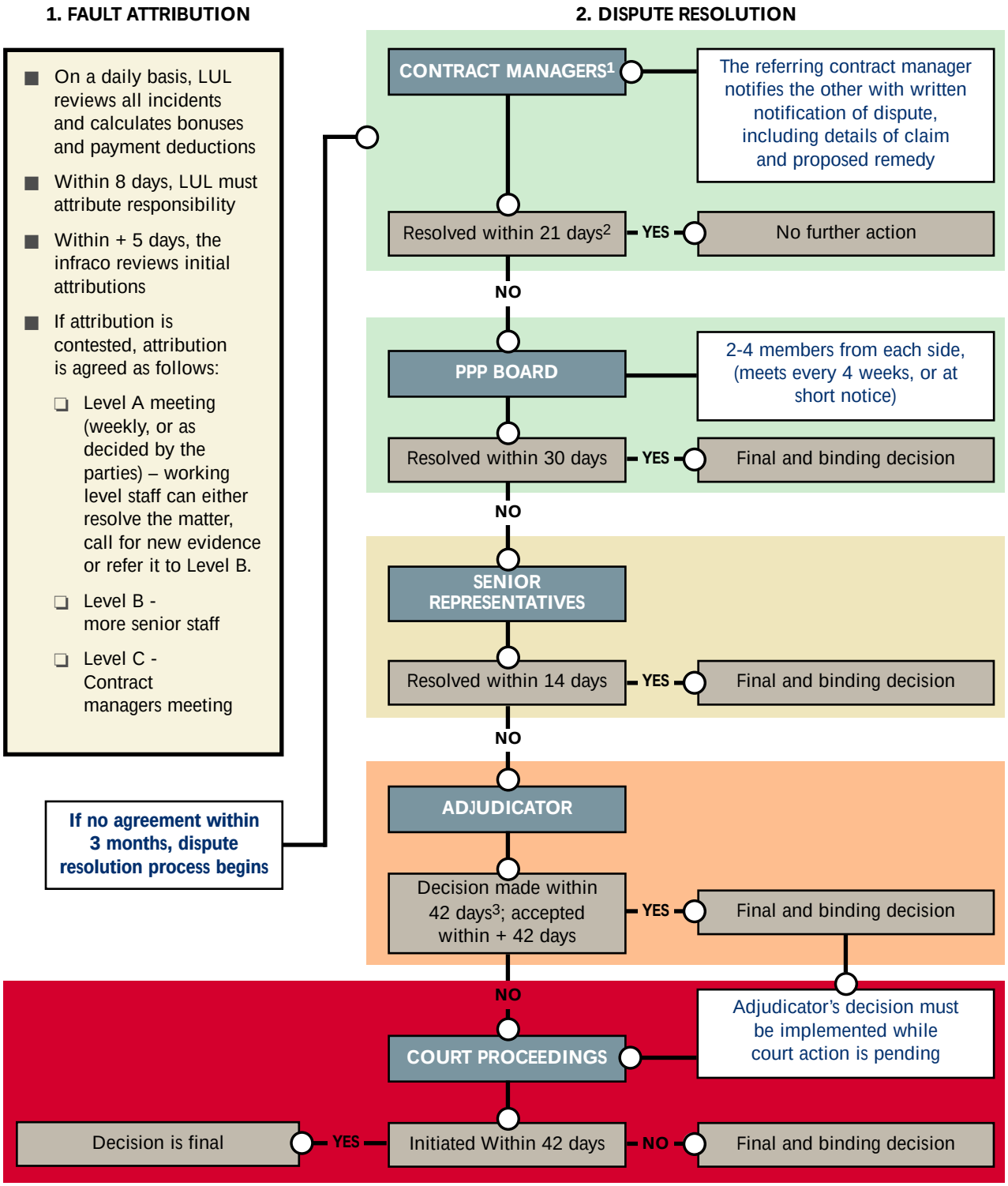
Deliverables under the contracts are, on the whole, clearly established:

- Infrastructure – the Infracos must deliver asset capability improvements and maintenance improvements (See A1), with some interfaces where deliverables are less clear, for example relating to power for the network (see C2).
- Operations – LUL must provide effective train operations and customer service, including the provision of tickets and information at stations to some 3 million passengers each day.

B1.4 | Deep understanding of the deal across all organisations will take time to achieve

On the basis of 10 interviews with senior managers at LUL and the Infracos (4 LUL, 3 Metronet, 3 Tube lines) in the first six months of the contracts there is a strong indication that they have a clear understanding of the deal. The focus groups we undertook with staff at all levels in June and July 2003 showed a more mixed picture, which may reflect the fact that it is early days in the PPPs, or that those lower down the chain of command are never likely to know the contracts in detail. But it could also mean that better communications with those on the front line may be required.

LUL and the infracos are expected to resolve disagreements as close to working level as possible, and otherwise to escalate issues following a structured, staged process.



Notes

1 *In the event of a dispute over standards, the contract managers are replaced by a "subject committee" of experts on both sides*

2 *30 day extension available upon request*

3 *28 days in certain circumstances*

Source: National Audit Office (derived from LUL documentation)

B2 General partnership working - good in most respects

In 2001, the NAO published the report *Managing the relationship to secure a successful partnership in PFI projects.* In 2003, the NAO published a further report, *PPP in practice: National Savings and Investments' deal with Siemens Business Services, four years on*, which examined how the parties built a successful partnership. These reports made various recommendations about how to make a partnership work in practice to achieve better service delivery. Do generic elements of the Tube partnerships represent good practice against the indicators set out in these two reports?

Most issues are resolved at working level

B2.1 | "There must be a partnership from the start" - the partnership was at risk due to an early transition of Tube ownership

Successful partnership was threatened at the outset of the PPPs. The deal was negotiated by the previous owners of the Tube (London Regional Transport), but it was not the Tube's new owners' (Transport for London) intended way of improving the Tube - see NAO report *London Underground: Were the Public Private Partnerships good deals?*, published simultaneously with this report for more on this. However, according to key personnel within both private and public partners, the transition to a new senior management team at LUL took place smoothly.

B2.2 | "Staff must have the right skills and attitudes" - unclear

Staff views on whether the appropriate skills and attitudes are in place for the PPPs are mixed:

- Shadow running was not seen as complete training for the PPPs - thinking was in "wooden £", rather than "silver £" and staff from both LUL and the Infracos (who used to be part of LUL) told us that this meant that they were not commercially incentivised to take decisions with the urgency required under the PPPs.
- Since the PPPs began staff from both LUL and the Infracos consistently suggested that parts of LUL still has an "old (non commercial) mindset", although there is evidence of improvement, for example in minimising the costs of delayed or cancelled access (*See Case study 5 on Access scheduling page 44*).

It is unclear if there is less or more variety of opportunities to develop skills under the PPPs. LUL operations staffing levels increased by some 15 per cent (from 11,749 to 13,527) during shadow running, primarily because of increased train services and operational stations (due to the Jubilee Line Extension). Staffing levels in all Infracos also increased during shadow running (overall rise of 22 per cent, from 6,210 to 7,551). There was therefore an increase in total opportunities, although the division into three Infracos may limit flexibility to work on different parts of the Tube network. Staffing levels in the first year of the PPPs have remained fairly constant.

B2.3 | "Parties must operate in a spirit of partnership" - yes, in general (so far)

In spite of initial opposition of one of the partners, LUL's parent organisation, Transport for London, the parties are operating generally in a spirit of partnership. Most issues are resolved at working level, and while financial resolution can take some time, operational solutions are typically found quite quickly - *see Case example 1: Fault attribution on page 32; Case example 2: Bad weather on page 34; and Case example 6 - Asset defects on page 46*. A further example of a spirit of partnership is what happened following ultrasonic testing in July 2003 by Infraco SSL, which unearthed four rail flaws in a stretch of track. The parties agreed immediately to a one day Temporary Speed Restriction and a longer overnight possession (the track was shut down two hours ahead of time) on the evening after the defects were found to enable rectification. Operations resumed safely at normal speeds the next day, as soon as the repairs were completed. In the absence of the speed restriction, the route would have had to close, and without a longer overnight possession there would be a risk of an engineering overrun into morning operations and disruption to a greater number of passengers.

B2.4 | "Parties should monitor and review the partnership regularly" - yes (so far)

The partners are planning to monitor, reassess and review the partnership on a regular basis:

- While the parties undertook due diligence and prepared risk registers during the preparation of the deals, we found no documentary evidence providing a clear and common understanding of risk allocation at contract signature. However, there is currently close working between LUL and the Infracos on strategic risk management and performance analysis. For example, LUL produces a joint performance report with each Infraco every month. This report sets out progress against contractual benchmarks in the previous four weeks, and indicates lessons that can be learned by all parties to improve the running of the PPPs.
- LUL is monitoring Infraco costs by reference to historic data, bid documents, lender documents and through benchmarking.

B2.5 | Parties should promote innovation and a whole business approach - time will tell

The PPPs are intended to promote innovation and a whole business approach as follows:

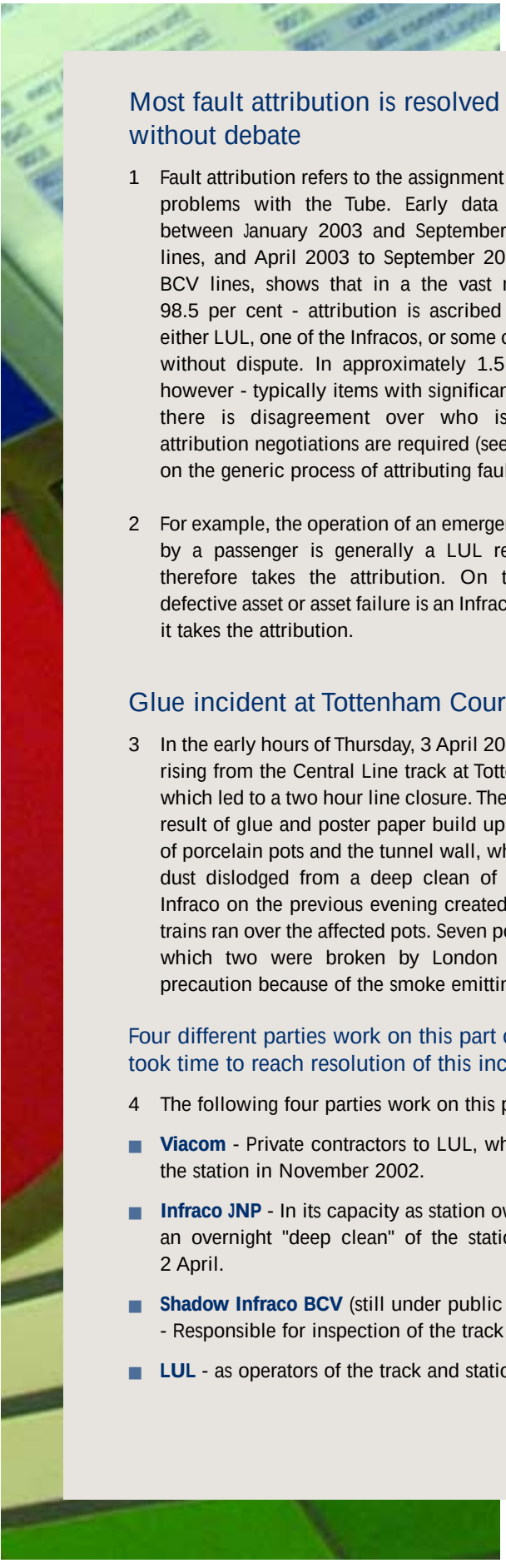
- Innovation – the Infracos are expected to apply private sector innovations to project management and asset design to ensure early identification of problems, on-time and on-cost delivery, and clear visibility of progress along the way. As might be expected at this early stage, there are no significant examples of a major innovation by the Infracos that has improved infrafrastructure delivery. But there are some indications of new responses to problems. For example, in the early months of the PPPs, signalling on the Jubilee Line was very unreliable, causing a high number of service disruptions. Infraco JNP responded by allocating resources in a new way - splitting up of staff into work groups and locating them at trouble spots on the line (previously all staff were all based at the Western end of the line) - to ensure a quicker response to signalling incidents and time will tell if this action on its own has a positive effect on the number of service disruptions.
- Whole business approach – the PPPs are intended to promote a whole business approach where partnership decisions are based on what is best for the business as a whole, rather than what is best for any Infraco or LUL. In our report on the partnership between National Savings and Siemens Business Services, we found that the parties changed their respective objectives and the nature of the partnership to achieve a single business focus. For example, National Savings now require key information reports that are less detailed and all-encompassing than specified in the contract. With the Tube PPPs, there is a degree of flexibility to change the scope of the contract for the benefit of all, but the success of scope changes will depend to a large extent on the quality of information exchanged between LUL and the Infracos - see *Case example 3: Scope changes* and Section A3.2.

  TFL consider that the Infracos are not demonstrating innovation or a whole business approach to any significant extent at this early stage.

CASE EXAMPLE 1 | FAULT ATTRIBUTION

Under the contracts, there is a formal process of attributing responsibility for a problem - for example, a train service delay - to one or both of the parties. Are these procedures working effectively in the opening months of the PPPs?

Most fault attribution is resolved quickly



Most fault attribution is resolved quickly and without debate

1 Fault attribution refers to the assignment of responsibility for problems with the Tube. Early data collected by LUL between January 2003 and September 2003 for the JNP lines, and April 2003 to September 2003 for the SSL and BCV lines, shows that in a the vast majority of cases - 98.5 per cent - attribution is ascribed without dispute to either LUL, one of the Infracos, or some combination thereof without dispute. In approximately 1.5 per cent of cases however - typically items with significant financial impact - there is disagreement over who is responsible and attribution negotiations are required (see Figure 12 for more on the generic process of attributing fault).

2 For example, the operation of an emergency alarm on a train by a passenger is generally a LUL responsibility and it therefore takes the attribution. On the other hand, a defective asset or asset failure is an Infraco responsibility and it takes the attribution.

Glue incident at Tottenham Court Road

3 In the early hours of Thursday, 3 April 2003 there was smoke rising from the Central Line track at Tottenham Court Road, which led to a two hour line closure. The smoke was a direct result of glue and poster paper build up between a number of porcelain pots and the tunnel wall, which combined with dust dislodged from a deep clean of the station by JNP Infraco on the previous evening created a fire hazard once trains ran over the affected pots. Seven pots were affected, of which two were broken by London Fire Brigade as a precaution because of the smoke emitting from them.

Four different parties work on this part of the line, and it took time to reach resolution of this incident

4 The following four parties work on this part of the line:

- **Viacom** - Private contractors to LUL, who put posters up at the station in November 2002.
- **Infraco JNP** - In its capacity as station owners, it carried out an overnight "deep clean" of the station on the night of 2 April.
- **Shadow Infraco BCV** (still under public control at the time) - Responsible for inspection of the track every 30 days.
- **LUL** - as operators of the track and station.

5 Reporting followed standard procedures with the completion of an Incident Report Form. This was followed by fault attribution negotiations because there was disagreement as to who was responsible for the incident. At Level A discussions, there remained a disagreement over who was at fault, and the case was escalated to Level B, where the parties decided that responsibility should be split 60 LUL: 40 Infraco BCV (still part of LUL at the time). This reflected the judgement that Viacom, and therefore LUL, were primarily to blame for not taking due care with the poster glue, while Infraco BCV should take some responsibility because their inspections did not spot the glue and enable remedial action to take place. Although the deep clean displaced some dust onto the glue, no attribution was made to JNP.

6 Level B agreement was reached on 21 May, approximately six weeks after the incident occurred.

There were operational and financial impacts from this incident

7 The Central line was closed for around 2½ hours while the glue was removed. The service closure led to 71,300 Lost Customer Hours. Infraco BCV assumed 40 per cent of these hours, but there was no direct financial penalty because shadow running was still in operation on the BCV lines and Infraco BCV was therefore still under public ownership. The Viacom contract with LUL does not provide for compensation for consequential damage of this nature, arising from the work that Viacom undertakes. Infraco inspection procedures are expected to provide adequate safeguards.

There are lessons to be learned from this case

8 Lessons include:

- Wherever possible, LUL needs to recover costs from a third party which is partly, or fully, at fault for a problem (where the Infracos are not at fault), taking account of the impact on the price of the contract.
- The need for better maintenance work and accompanying oversight, which all parties are attending to, e.g. covering and cleaning the pots; regular inspections by Infracos.
- The need for better communications between the parties.

CASE EXAMPLE 2 | BAD WEATHER

The contracts provide specific guidance on responsibility for dealing with bad weather service disruptions. The Infracos are not normally granted relief in cases of bad weather, except in extreme cases such as the "extraordinary storm" of January 2003. Do the parties manage bad weather incidents effectively?

"Extraordinary storm" of snow (January 2003)

1 Force majeure circumstances include war, terrorism, fire, tunnel collapse, and extraordinary storm. In these cases, the Infraco gets relief from performance abatements if (1) the event was beyond its control; and (2) it took all reasonable steps to avoid or mitigate the consequences of the action.

2 On 30 January 2003, the Tube experienced its first force majeure event since the start of the PPPs. There was a downfall of snow in North London which resulted in the stalling of 18 trains on the Jubilee Line, 9 trains on the Northern Line, 5 trains on the Piccadilly line, and 3 trains on the Metropolitan Line. These lines and the Bakerloo line were closed partially as a result (see boxed text).

3 The conditions were such that drivers were unable to see signals, thus creating significant concerns about passenger and driver safety on parts of the lines where trains were not stalling. Several hundred thousand passengers were severely delayed in, or abandoned their journeys across London between 30 and 31 January 2003.

4 The event was classed as an "extraordinary storm" because of the combined factors of high quantum and speed of snowfall, strong winds, temperatures around freezing, and high humidity. The Meteorological Office concluded that the conditions in north west London - where passengers were most severely affected - were the most severe in 53 years.

A firefighter's strike and other line closures also disrupted services on this day

5 Other factors compounded the effect of the storm. Lack of service on the Central or Waterloo & City lines because of safety checks following the Chancery Lane derailment, together with suspension of bus services in North London, also caused by the bad weather, placed additional demand on the network that was in operation. Finally, stations served only by lifts were closed due to a London Fire Brigade strike.

30 January – CLOSURE

16.00-17.00

Suspension of service on Jubilee (Wembley Park to Stanmore, later extended from Waterloo to Stanmore), Northern (from Golders Green to Edgware and Archway to Mill Hill East/High Barnet), Piccadilly (Acton Town to Rayners Lane, later the Heathrow branch), Metropolitan (north of Finchley Road) and Bakerloo (north of Queens Park) lines. Some other stations (e.g. Clapham North, Kings Cross and Green Park) are also closed for short periods due to loss of power or overcrowding. All other sections of these lines and other lines continued to operate, but with delays.

31 January - RE-OPENING

09.35

Metropolitan services are re-started with a limited service.

15.30-17.40

Jubilee, Northern, Piccadilly and Bakerloo lines are re-opened.

6 Also, some Tube staff were legally required to start later than normal on 31 January having worked late the previous night to try to alleviate the effects of the storm. Other Tube staff could not get to work because of the effect the storm had on the roads.

The parties took some steps to mitigate the storm's effects

7 The main mitigation steps taken by LUL were as follows:

- Operation of de-icing trains, which help to prevent icing of the rails, from approximately 2015 on 29 January.
- Scraping of the rails by LUL drivers and Infraco staff.
- Informing customers about delays and suspensions to services.
- Arranging taxis for passengers, where practicable.

But there were weaknesses in planning and response

8 Weaknesses included:

- LUL relied on a single source for weather forecasts, the output of which conflicted with television and radio forecasts that predicted heavy snow much further in advance.
- Manual de-icing of the track by drivers with brushes could not keep pace with the speed of the downpour.
- Train sleet brushes and anti-icing systems were insufficient to deal with the rapid build up of snow under the train shoes.
- Infraco JNP did not meet all its responsibilities for ensuring the correct fluid was in the anti-icing units and sequencing of the anti-icing trains on the Northern Line in the correct formation, in order that all the track is de-iced consistently.

The Infracos were granted relief from most of the train availability abatements, but only after much debate

9 Because it undertook most of the necessary steps required - most of the anti-icing units had the correct fluid in them and the vast majority of the de-icing trains ran - Infraco JNP took only a minor share of the attribution. The parties agreed that the Infraco JNP pay 30 per cent of the line suspension abatements on the Northern Line (21,080 out of 70,720 Lost Customer Hours), 10 per cent on the Piccadilly line (4,340 out of 43,430 Lost Customer Hours) and 0 per cent on the Jubilee line (0 out of 119,907 LCH).[8] Since it was performing below benchmark at the time, JNP faced payment deductions at £6 per hour, for a total of £152,520. The Infracos also faced abatements for smaller individual incidents and disruptions (individually less than 1000 Lost Customer Hours, which is the minimum that can be jointly attributed) relating to platform and station closures due to icy, dangerous walkways - 1,505 Lost Customer Hours on the Jubilee Line; 10,992 Lost Customer Hours on the Piccadilly line; total of £74,982 (at £6 per hour). LUL paid out some £84,000 to passengers in compensation because of the service disruptions, around three times the level of compensation on a typical day.

10 Attribution of responsibility was resolved only in mid-May, some 3½ months after the incident - at Level C. This was because snow generally would not constitute an "extraordinary storm" and it took some information gathering before this classification for the storm was agreed upon.

LUL and the Infracos have since taken remedial action, but a January 2004 bad weather incident showed that some lessons were not learned

11 The parties reported to us that they have learned valuable lessons about how to optimise responses to bad weather and improve contractual definitions. Remedial action since the event included:

- To deal with future bad weather: more frequent and localised weather forecasts; snow and ice contingency plans for each line; ensuring train de-icing units are in good working order; and improved capability to move staff and materials - use of engineer trains and associated staff and materials.
- To improve the functioning of the PPPs - a library of incidents that can be attributed without the need for extended discussion.

12 In late January 2004, there was a similar, though less severe, case of winter weather that affected Tube services. On this occasion, the snow fell more on the lines that Infraco SSL is responsible for - the Metropolitan line in particular. Total Lost Customer Hours resulting from the incident were some 10,000 on JNP lines and 120,000 on SSL lines.

13 The main problems that arose in 2004 indicate that some lessons from managing last year's more severe weather were not disseminated across the network:

- De-icing equipment on several trains failed, but on SSL trains rather than JNP trains this time.
- A number of platforms iced up, indicating inadequate use of the de-icing fluids by LUL and Infraco SSL staff, as they are jointly responsible for clearing of ice and snow. (Infraco SSL are now providing additional training to LUL staff who undertake these duties).

Some of the passenger delays were caused by trains getting stuck in the depot at Neasden, and therefore not being available for service. Infraco SSL has admitted financial liability for this service disruption, but precise financial impacts were not determined through the formal fault attribution process as at May 2004.

8 *Under the contracts, joint attribution must a) exceed 1,000 Lost Customer Hours, b) be agreed at Level B or above to reduce the possibility of "horse trading" at working level and c) be made in increments of 10 per cent.*

CASE EXAMPLE 3 | SCOPE CHANGES

The scope of the contracts can be changed in a limited number of ways - for example through minor works or major enhancements. An early safety change - a special project agreed in concept at contract signature - involves the introduction of runback protection on Northern Line trains.

Making scope changes

Outside Periodic Reviews there are several procedures for making changes to the PPPs

1 Within the contracts, LUL has rights to request that an Infraco undertake:

- Minor works (mandatory) - works below £20,000, to a maximum aggregate of £4 million per contract in any one year, e.g. refitting part of a ticket office. LUL keeps a running total of money spent on minor works, and claws back any money unspent in the next financial year. Minor works must take place to an agreed timetable, otherwise the Infraco faces a payment abatement;
- Intermediate works (mandatory) - between £20,000 and £5 million, up to a maximum aggregate value of £5 million per year. Intermediate works are executed via LUL's specified rights (see below), but are separate from ordinary specified rights as i) the Infraco must undertake the work, and ii) there is no pre-determined subject matter;
- LUL specified rights - of varying value, with subject matter generally agreed at contract signature, e.g. air-conditioning; actions relating to Heathrow Terminal 5; seventh car on Jubilee Line trains, but for which compensation must be generally agreed before the Specified Right is exercised; and
- Major enhancements - of negotiatiable value, where design and feasibility work are required and which the Infraco is not mandated to deliver. Examples include station congestion relief projects and line extension programmes. For these works, LUL has a procurement process which includes: consultation of the LUL Service Plan, a check that the requirement is not already part of the contract, preparation of a "Requirement Statement", a business case, and financial approval. LUL may use an alternative provider for such works (and - with Infraco agreement - for intermediate works).

LUL seek to benchmark the costs of additional works

2 LUL contracts with a team of quantity surveyors who benchmark Infraco costs against market rates. LUL believe this provides assurance of value for money that may help resolve any eventual dispute over costs. With the exercise of specified rights and requests for major enhancements, if LUL is not satisfied with the value for money that the Infraco provides it

flexibility to change

may seek out an alternative provider. An Infraco is often best placed to support enabling works necessary for essential LUL projects, such as the Connect radio and communications contract (see Section C2) although they do not form part of the PPP contracts.

There is some flexibility to change the scope of work due to factors not already known about at contract signature

3 External factors that could lead to a scope change include:

- Safety and security changes - for example, the decision by LUL in 2002 to introduce more CCTV cameras across the network. This work is additional to CCTV provisions in contractual plans to refurbish and modernise stations.
- Standard changes - For example, LUL's statutory safety case requires it to restructure and rationalise its standards regime, for instance by reducing the number of standards from around the current 2,200 to around 400. Any changes in standards will need to be discussed with the Infracos to see if there would be any change to the scope of their work, which would need to be reflected in a revised service charge. A change in safety standards would enable the Infracos to claim compensation from LUL in the event of more costs being incurred than anticipated at contract signature.
- Law changes - an example would be a change to safety regulations affecting only railways, which LUL would be mandated to implement and provide the Infraco with any necessary compensation.

A safety change - train runback protection

An early scope change involves the introduction of runback protection on all Tube trains

4 In July 2000, due to a combination of factors, a northbound Northern Line train was able to roll southbound (on the northbound track) for nearly 1km before stopping near Chalk Farm station. The train then remained stationary for approximately 10 minutes, meaning a short delay to passengers who got off and caught the next Edgware train. There were no passenger injuries or asset damage, but LUL launched an immediate investigation as there would be potentially serious consequences from any repetition.

5 As a result of the investigation, LUL decided to introduce a special project into the contracts that specified runback protection on all train fleets, except Central and Victoria (which already incorporate runback protection as part of their Automatic Train Protection). The introduction of these systems is expected to prevent reoccurrence of a train accidentally running backwards. LUL report there will be a very slight impact on reliability, of an anticipated additional 20 failures per year across the network (equivalent to one failure every three million kilometres). LUL will consider limited relief from asset performance requirements over the six month post-implementation period.

6 The work programme will run for most of 2004 and 2005 and is expected to cost LUL some £18.5 million across all affected lines of the network. LUL do not expect there to be any direct operational impact, with the changes involving the refitting of only one train at a time. The general risk of inadequate supply of sufficient operational trains remains with the Infraco, although an exception would be made if there were not enough operational trains because of the runback protection work programme.

Successful partnership on scope changes will depend on clear accountability and the parties acting in a spirit of partnership

7 At the time of contract signature, there was more than one point of administrative accountability within LUL for many issues. This contrasted with the situation of one point of accountabilty within an Infraco. LUL has since sought to make accountability for decisions more transparent, in order that scope changes and other partnership issues are efficiently managed. Tube Lines reports that the new management of LUL is placing increased emphasis on developing pragmatic solutions.

8 LUL's pragmatic approach puts pressure on the Infracos to respond with a "win-win" approach to discussions on scope changes so that they do not seek to exploit, and are seen not to exploit, their position as sole or first choice supplier.

B3 Partnership on operational issues - generally good so far, but challenges ahead in managing ageing assets

There are a number of partnership issues that are specific to the Tube PPPs, namely: passenger safety; dealing with multiple interfaces; and managing ageing assets. Is there a good partnership on these issues?

B3.1 | Ensuring passenger safety - in line with performance in recent years

There is a joint regime to manage passenger safety. LUL retains responsibility for passenger safety, and its safety case must be accepted by the Health & Safety Executive (HSE). The Infraco is generally liable if one of its assets is delivered to LUL in an unsafe state. Each Infraco has its own Safety Case that it must comply with, but it must also co-operate with LUL to allow it to meet its statutory Safety Case responsibilities. The HSE takes high level assurance that the Infracos are adhering to health and safety law from the regime imposed by London Underground and the existence of a range of industry standards to regulate the work of the Infraco. In 2003-04, all Infracos maintained compliance with the Safety Case requirements and safety outcomes are consistent with recent years, with roughly two derailments per year prior to, and under, the PPPs - see *Case example 4* on page 40.

B3.2 | Dealing with multiple operational interfaces - positive early signs

The parties are so far dealing successfully with multiple interfaces. Numerous parties work on the Tube, and all need access. To date, the system of scheduling access appears to work well, with more punctual handover of the track by LUL to the Infracos than during shadow running. However, there are some engineering overruns into early morning operations - see *Case example 5* on page 44.

B3.3 | Management of ageing assets - there are significant challenges ahead

The management of ageing assets poses serious questions for the Infracos. The Infracos must improve the condition of the assets such that the assets reach a "steady state" condition by 2026. But the actual condition of some assets is unknown - for example, the condition of deep tunnels on BCV lines (49 per cent of BCV assets) is uncategorised. By the end of the first period, any uncategorised assets (known as grey assets) must be assessed and identified.

Defects are arising on the axle boxes of Piccadilly Line trains. This is having an adverse impact on passengers, with less trains available for service. Infraco JNP has begun a programme to rectify these faults, but there is disagreement on who should bear the financial burden for these repairs - see *Case example 6: Asset defects*.

CASE EXAMPLE 4 | PASSENGER SAFETY

London Underground historically has a good record of passenger safety. Between January 2003 (towards the end of shadow running of the PPPs) and March 2004 (the end of year one), there were three in-service train derailments. Are the PPP structures dealing with the consequences for passenger safety in a robust manner?

Early outcomes and processes - in line with recent past

- **Outcomes** - The two in-service derailments in the first year of the PPPs is consistent with the trend reported by LUL since 1993-94, with derailments ranging from 0 to 4 each year around an average of approximately two per year.[9]
- **Processes** - None of the derailments in the first year of the PPPs have led to any changes in the contract or safety cases but, as a result of the investigations into these derailments, there may be changes to some LUL safety and engineering standards. For example, the formal investigation following the Hammersmith derailment recommended improvements to track inspection, including possibly undertaking track inspections during daylight; better lighting for night-time inspections; review of risk assessments for patrolling; improved guidance on the equipment used by patrollers; and an improved system of ultrasonic testing.

9 *Figures compiled by the Health and Safety Executive show a similar trend in the last 10 years, with some discrepancies between the two data sets due to factors such as different recording and classification systems.*

Derailment 1 - Chancery Lane (25 January 2003)

1 The last four carriages of the train derailed as it entered Chancery Lane station on 25 January, 2003. There was little structural damage, but three carriages were damaged after hitting the tunnel wall and station platform. A door was ripped off and several windows were broken. Passengers on the train were promptly evacuated by LUL staff (including the driver), with 32 suffering minor injuries such as cuts and bruises. Incident management arrangements were initiated immediately, and the London Fire Brigade and Ambulance Service were called within two minutes.

The likely cause of the incident was a failure of a bearing cage on the gearbox

2 Initial investigations focused on the main motor bracket bolts and the safety bolts, which should keep the motor in its proper place. Faulty safety bolts were blamed for two similar previous incidents at Hainault and Loughton, but in this case these had been checked and passed fit only 48 hours before the derailment.

3 LUL's Final Investigation Report found that the most likely root cause of the crash was a failure of a bearing cage on the gearbox, which in turn caused the motor attachment bolts to break. The motor was not retained by the safety brackets designed to hold it in place.

The accident occurred during shadow running of the BCV lines

4 At the time, LUL owned and operated the trains and Infraco BCV (then a subsidiary of LUL) maintained them. Since the accident and during the line closure, Metronet took over the maintenance and modification of the trains.

There were significant financial and operational impacts

5 The costs impact is approximately £60 million - traffic revenue losses of £22 million, £8 million in refunds/compensation, £12 million for replacement buses, £14 million for initial fleet modifications, and £4 million in other costs. Costs of longer term fleet modifications are still subject to commercial discussions.

6 The Central Line was closed for 11 weeks and the Waterloo and City Line for 3 weeks while investigators sought to find the cause of the accident and implement an interim engineering solution. In the wake of the derailment, Infraco BCV developed a technical solution and submitted it to LUL in late March 2004 as a basis for discussions. The closure also led to considerable overcrowding on other lines and in several stations such as Kings Cross.

7 A limited service began on 14 March and services were resumed to all stations on the Central Line by 12 April. At this stage, the cause of the motor detachment was uncertain. Infraco BCV engineers redesigned and fitted new bolts and safety brackets to the motors on its 85-strong fleet of trains. This work also included checks on all components attached to the motors including the gear box, although at this time the underlying gearbox problem had not been found. Due to uncertainty about line reopening dates, test trains running on the line, and the lengthy lead time for major works, Infraco BCV was not able to reschedule the major works on the line to take advantage of the closure.

8 LUL arranged passenger bus services to link stations with alternative rail services. While 85 per cent of Central Line passengers were aware of the replacement bus service only approximately 33 per cent used them. Satisfaction with the service was low (46 per cent) but LUL say that it was unlikely to be high because buses are usually slower than the Tube.

Derailment 2 - Hammersmith derailment (17 October 2003)

9 At 21.11 on Friday 17 October, an east bound Piccadilly line train derailed shortly after leaving Hammersmith station. The train driver was not immediately aware that the train had derailed and the train was stopped by the emergency brake. One passenger pulled the Passenger Emergency alarm in the carriage and told the driver he thought that the train had derailed. However, the driver chose to disregard this. When the driver tried to move the train he realised that there were further problems as the train was not driving normally. The driver of a west bound Piccadilly Line train was able to confirm that the last carriage had derailed as he drove past.

10 This stretch of the Piccadilly Line between Acton Town and Hammersmith is maintained by Infraco SSL due to its close proximity to the District Line.

11 The westbound train driver phoned the Line Controller at Earl's Court to inform him of the derailment. The driver of the derailed train had problems with his train radio and was unable to communicate with the line controller clearly. The cause for the radio failure has not been identified but there is a PFI contract to install a new radio system throughout the Underground by December 2006. The 77 passengers were evacuated by 22.22 hours. There were no injuries.

The cause of the incident was a broken rail

12 A formal investigation by LUL and Infraco SSL in October 2003 found the cause of the derailment to be a broken rail. The track was inspected the night before, but the damaged rail had not been detected. The report notes that neither visual inspections by patrols, nor the current method of ultrasonic testing (which was undertaken), would have found, and will not reliably find this type of rail defect, which initiated on the underside of the rail.

There were operational and financial impacts

13 The Piccadilly and District Lines were suspended for the remainder of the evening (around 2 hours) and the faulty track was removed and replaced before services resumed by 6.30am on Saturday 18th October. Due to the incident, there were 45,904 Lost Customer Hours and therefore Infraco SSL faced a payment abatement of £137,712 (calculated at £3 per Lost Customer Hour because the Infraco was performing in the above benchmark band of performance at the time). Infraco SSL's costs in respect of the repairs must also be borne by the Infraco.

Derailment 3 - Camden town (19 October 2003)

14 On 10.01hrs on 19 October 2003, a Northern Line train travelling from Morden to High Barnet via Bank derailed as it approached Camden Town. The sixth car left the track and collided with a wall separating the branches of the Edgeware and High Barnet Branch. The rear of the fifth carriage also derailed, scraping the tunnel wall. The fifth and sixth carriages separated. The automatic braking system stopped the train. The driver initiated a mayday call and the emergency services were called. By 11.10 the train and three other trains stopped in tunnels as a result of the incident were evacuated. There were two relatively serious injuries, a broken leg and head injuries. Seven passengers were taken to hospital while others received first aid at the station.

The accident was caused by a design flaw in a points switchblade

15 A joint report published in February 2004 by LUL and Infraco JNP's owners Tube Lines found that the likely primary cause of the derailment was a weakness in the design of the switchblade of the points (in use without incident since 1968), combined with a number of other factors such that wheels tended to over-climb a new switchblade, an anomalous (but within standard) train bogie adjustment and recently re-profiled train wheels. Tube Lines staff, experienced and all formerly employed by LUL, replaced the switchblade the night before the incident. The lack of wear, together with other specific factors including the sharpness of the curve before the point and the high levels of friction between the wheels and the rails, is likely to have caused the train to derail.

16 Most switchblades are not of this design, which are only used on tight curves and are avoided wherever possible. LUL has prohibited, on all three Infracos, the replacement of switchblades with this type, unless special precautions are agreed with LUL in advance where replacement is essential. Tube Lines has produced a new design of switchblade. A switchblade to this new design has been installed and commissioned at Camden Town and is subject to detailed performance monitoring. So far the switchblade is performing well. Assuming it achieves the wear and performance characteristics required over time, the design will be accepted for wider use.

There were operational and financial impacts

17 The derailment caused considerable damage to signalling, control and signalling power supply cables that were mounted on the wall where the tube car hit. Repairing and testing these cables delayed restoring services and permitting passengers to switch branches at Camden Town. The line remained partially closed for 8 days (Edgware branch) and 10 days (High Barnet branch). Until re-opening of a fully integrated service on 7 March 2004, passengers who wanted to use the other branch had to switch to another train at Camden or Euston. During this time, there were no services on the Edgware branch between Charing Cross and Golders Green; or on the High Barnet branch between Euston and East Finchley.

18 Replacement bus services (60 buses) were in place less than four hours after the derailment (95 buses on the first following day). Services ran every two minutes during peak periods, stopping at every tube station. However, some delays were experienced on the route to Charing Cross because of traffic and congestion. Shuttle services ran between High Barnet and East Finchley, Golders Green to Edgware. There was some overcrowding on other lines and stations but considerably less than experienced after the Chancery Lane derailment.

19 LUL learnt about the importance of communications from Chancery Lane. It made blanket announcements across all underground stations and it also issued bulletins in the media, over the web, had whiteboard notices and posters in stations and distributed leaflets and handouts for passengers detailing their travel options.

20 LUL estimates lost revenue of approximately £5 million, based on expected and actual revenue rather than lost customer hours. On top of this LUL had to pay a further £5.2 million in costs for: replacement buses (£2.8 million), passenger compensation (£2 million), and other items (£0.4 million).

21 The final cost of repairing the infrastructure is unknown at present, and there is debate about who is responsible for this cost, although LUL is of the view that Infraco JNP (Tube Lines) is responsible to the extent that the damage is uninsured. If Infraco JNP (Tube Lines) does not dispute responsibility for this risk, abatements payable apply to the first 48 hours of suspension of services - at a value of some £7 million - provided remedial work is undertaken economically and efficiently. Abatements only apply to the first 48 hours of such events because this is specified in the PPP contracts. Otherwise, LUL reason that the Infracos would have needed business interruption insurance to cover such risks and, if the period of disruption is extensive, very high insurance premiums would have resulted, pushing up the Infrastructure Service Charge.

The response to the derailments show that the PPP structures probably function as designed with respect to safety

22 The Chancery Lane derailment happened during shadow running, although there were still lessons for the PPPs. LUL and the Infracos agreed 24 technical, engineering and other recommendations - including the need for better communications - to act on in case of similar incidents in the future. The joint responses, investigations and implementation of the resulting improvement recommendations to the latter two derailments suggest that the PPP structures probably function as designed with respect to safety. This tentative conclusion, however, needs to be reviewed in the light of the outcome of the resolution of the related commercial issues.

CASE EXAMPLE 5 | ACCESS SCHEDULING

There are numerous parties involved in PPP work and there is therefore a need for a system to co-ordinate safe and equitable access. The Access Code of the PPP contracts was developed to address this need. Is the system working successfully so far?

Booking access to the Tube network

1 The process of booking access to the Tube network so as to enable "fair and equitable" access for all parties is set out in the contractual Access Code.

2 Access can be booked either:

- At night, when no trains are running (engineering hours)
- Or daytime periods, when stations, lifts and escalators or stretches of track are closed to allow the Infracos to make repairs.

3 During engineering hours, usually 01.30-4.30am, the Infraco responsible for that particular section of the infrastructure approves or denies requests for access from other Infracos, PFI contractors and third parties, while LUL denies or accepts requests for closures in accordance with the Access Code. All access is booked using LUL's SABRE (Site Access booking for Railway Engineering) system, which was in use during, and prior to, shadow running.

Access to the network is now placed on a commercial footing

4 The Access Code tries to incentivise the Infracos to plan ahead by specifying minimum time limits for requesting access. For example, a minor closure requires 222 days notice, access to track needs 28 days notice, and access to stations 21 days notice.

5 LUL does allow access with less than 48 hours notice, but this is to be done only as a last resort. Infracos can also request urgent access during engineering hours if failure to do the work would adversely affect passenger services or safety.

6 Work during engineering hours is "free". After that, the Infracos are allocated a specific number of Lost Customer Hours which they can use for maintenance and engineering works during closures.

7 The Access Code puts access on a commercial footing and has encouraged all parties, including LUL, to recognise the value of conducting work during engineering hours and ensuring that access is made available on time. Depending on the cause, LUL may be penalised if it hands over sections of the track later than scheduled. Similarly, the Infraco must hand back the track to LUL on time, or face Engineering Overrun Service Points at 5 Service Points - or £250 - per minute.

8 If a party is delayed more than 15 minutes for access during engineering hours or for a week day minor closure, 2 hours for a weekend minor closure, or 1 day for a lift or escalator closure, then the responsible party must pay compensation - from £800 for any routine, planned preventative works (maintenance, fault fixing, etc.), £6,000 for other works, £180,000 for weekend minor closures, £2,000 (up to £20,000) for lift and escalator closures, and £500 for routeway closures. These figures are illustrative, based on the average cost per activity, because the rules are complex and various scales apply.

9 Examples of access booking include:

- **Minor track closure (i.e. a closure at any time during 9pm-6am on a week day or anytime at weekends)** - Infraco SSL sought access from LUL for a minor closure of the track between Kings Cross to Farringdon for ballasted track renewals between 27/02/04 to 01/03/04. In accordance with the Access Code, the request was made 222 days in advance. LUL approved the closure.
- **Access to track and station** - Infraco BCV requested access to track and station at Acton Town on 1 May 2003 to install track signage, cross track walkways and general track maintenance. A closure was not required. The track is owned by Infraco SSL, the station by Tube lines, yet Infraco BCV is responsible for the maintenance of the track. Therefore Infraco BCV had to request access to the track from Infraco SSL and access to the station from Infraco JNP. Infraco BCV recorded the request on Sabre and access was granted by both parties. This work was completed within engineering hours.

Access performance in the first year is reasonable

10 Performance on access scheduling, to the extent that LUL can control, shows an improving trend. In the period between April 2002 and September 2003, average late handover of the track by LUL to the Infracos fell from around 20 per cent to approximately 10 per cent. There was also a trend towards reduced variation around the average. Smoother handover led to LUL's financial payments to the Infracos falling from some £700,000 per month to just £50,000 per month over this 18 month period. LUL ascribe the reduction in late handover to the need to respond to such commercial incentives.

11 Overruns by Infracos into operational hours do occur and there may be increasing instances where, on balance, they elect to allow engineering work to overrun into operating hours and accept a deduction to the service charge due to the accumulation of Lost Customer Hours. In the first year of the PPPs, there were some 226 delays due to late surrender of the track by the Infracos. This represents an increase of approximately 20 per cent on the final year of shadow running, but only 0.15 per cent of total accepted requests for track access by the Infracos, of which there are some 140,000 per year. In most cases, engineering work overruns last less than 30 minutes (the average delay across all Infracos under the PPPs is 28 minutes), limiting disruption for passengers as the overruns do not directly interfere with rush hour operations. Such overruns do, however, disrupt LUL's start to the day with some knock-on effects during the rush hour.

12 More punctual handover of track by LUL and occasional requests for late engineering have meant more time for engineering work to be undertaken. There are numerous factors that influence the results of engineering work, but it is likely that more efficient use of night time engineering hours should result in improved fault response times and completion of routine work. On the other hand LUL reports a low utilisation of booked time and has concerns that low productivity, for example during weekend closures, may impact passengers adversely by leading to an increase in the number of closures at other times.

CASE EXAMPLE 6 | ASSET DEFECTS

Since the beginning of the PPPs, a number of faults with the bearings on Piccadilly Line axle boxes have been discovered. These asset defects are asset failures that could not be predicted precisely, for which the Infraco would normally bear the risk. But in this case the parties are in disagreement as to who is at risk. Are the parties resolving asset defects issues appropriately?

Axle box defects on Piccadilly Line trains

1 In 1973, the whole rolling stock of the Piccadilly Line - some 86 trains - was replaced. In 1995, LUL became aware that axle box failures on the line were increasing. It therefore undertook a programme to replace the bearings in the boxes.

2 LUL believed that this work programme would solve the axle box failures until the rolling stock was replaced in 2014. However, in early 2003, operators and engineers variously identified axle box defects on three units of the fleet. Infraco JNP undertook an audit of the axle boxes and bearings on the fleet and established that the boxes were wearing faster than expected because of:

- A timetable change introduced in 1995/96, which effectively increased the off peak nearer to a peak timetable and thus increased the annual kilometres travelled by each train.
- A train interior refurbishment that increased each car's weight by one tonne.

The parties are undertaking steps to mitigate the problem

3 Mitigation steps include:

- **LUL** - Initially, operators applied the defective in-service guidelines in a blanket fashion. This required that the Emergency Response Unit, the Infracos and LUL all attend any situations where there was a reported smell of burning. But in many cases, there was no problem with the train or the cause of the problem was much less serious than a hot axle box. Station staff and duty managers are now trained to explicitly identify when and when not to call the various parties to attend the incident based on a judicious assessment of the risks involved.
- **Infraco JNP** - Axle box replacement and the introduction of thermal imaging units and hot axle box monitors.

There are significant operational and financial impacts

4 The operational and financial impacts are as follows:

- **Operational impacts** - Since the PPPs began, there have been over 100 incidents of suspected axle box defects, and LUL has consequently withdrawn these trains from service. While in excess of 90 per cent of cases the reported smell of burning turns out to be a minor problem such as oil leaks, brakes hanging on, dust build up, or the result of a false alarm, there are sufficient withdrawals to jeopodize Infraco's ability to provide sufficient trains (76 trains in the peak) from January 2004 until the replacement programme is complete in mid-2005. The current fleet size provides 10 more trains than needed to support the timetable, but with others being refitted with runback protection, undergoing air conditioning tests, etc, there is little contingency left to deal with other problems like latent defects. The replacement programme reduces the number of trains in service slightly.
- **Financial impacts** Infraco JNP reports that it has borne some £9 million of capital costs to date attributable to the wheelset replacement programme and some 411,600 Lost Customer Hours, with a further 5,000 Lost Customer Hours in abeyance until commercial agreement is reached. The Infraco could also face abatements for not making enough trains available for service. Capital investment includes provision of new wheelsets (axle boxes, wheels, axles, gearwheel and suspension sleeve, air hoses, and brake cylinders) on 173 units, in addition to expenditure on new thermal imaging cameras and axle monitors. If completed successfully, LUL expect there to be no further significant work on the axle boxes until the stock is replaced in 2014.

The parties are in disagreement as to who should cover the costs

5 LUL claims that the axle box failures represent a risk taken that the Infraco priced for in the contracts: the need to maintain assets that are fit for purpose and to keep safety risks As Low As Reasonably Practicable (ALARP). LUL believe that Infraco JNP should therefore bear the capital costs of the replacement programme and any abatements caused by reduced availability.

6 But Infraco JNP argues that it is not liable for these costs, because:

- The issue was identified late in the negotiations, just prior to transfer. At the time, the Infracos argued that efforts to rectify such defaults should be defined as "transition projects". LUL successfully rejected this argument on the grounds that this risk was already priced into the Infraco bid.
- Infraco JNP also suggest that LUL is changing the standard on roller bearings and has applied for change in classification as a safety change in relation to the replacement of the axle boxes. The Piccadilly Line trains currently have spherical roller bearings, whereas other fleets are equipped with tapered roller bearings. The Infraco proposes that Piccadilly Line trains be fitted with tapered roller bearings, to ensure that the bearings last until the end of the train stock's life. They argue that not undertaking a like for like replacement represents a change in standard over what was required at contract signature. LUL, however, state that there is no standard for bearings, but rather that the choice of bearing design resides with the Infraco so long as risks are kept ALARP - which would be the case with a like for like replacement, at least in the early periods of their lives.

Could be an important precedent for settling without acrimony, and minimising legal costs

7 The full resolution of the axle box problems could point the way for partnership working in future fault attribution and in the handling of abatements arising from non-availability of trains during an agreed replacement programme. Resolving matters in an amicable way also reduces the costs required to defend legal positions on each side, which could potentially be extensive. LUL has not yet incurred what it considers to be substantial legal costs since financial close of the PPPs - in 2003-04 LUL spent £1.5 million on internal and external legal costs relating to the PPP, excluding stand alone costs such as those relating to Tube Lines refinancing. Assuming five or six disputes run their course, LUL projects a spend of £2.75 million in 2004-05.

B4 It will take more time to determine whether oversight mechanisms will help ensure good outcomes for the public

A number of parties are expected to provide external oversight, but there is no single point of outside review. Is external oversight likely to be effectively administered?

B4.1 | The contracts provide for a Partnership Director, with responsibility to the Infracos and customers

A Partnership director sits as an independent, non-executive director on the boards of the three Infracos and is required to act for the good of the Infraco but with a view to protecting the public interest. Ms E. Noel Harwerth, was appointed to the post in July 2003, after a period in which a "shadow" director was in position. According to the contracts, she should take a particular view to:

- Providing independent commercial judgement issues of strategy, on performance, resources and standards of conduct;
- Enhancing the effective and transparent functioning of the Board, and promote adherence to corporate governance;
- Promoting good communication, co-ordination and co-operation between the parties;
- Promoting compliance with competitive tendering requirements in the contract;
- Promoting good safety and environmental management, including effective monitoring to ensure compliance with contracts and statute. The Partnership Director is a member of the Safety Review Committee;
- Promoting good relations with staff, e.g. on pensions and personal development, in adherence with contracts and statute; and facilitating agreement on asset management, dividend proposals, settlement of contractual disputes (LUL told us that this would most likely happen if and when these disputes reach Director level).

The Partnership Director has access to independent professional advice of up to £20,000 per year, and full access to Infraco documentation.

B4.2 | The Partnership Director is providing monthly review at Infraco board meetings, but it is early days to assess the impact

Since she formally took up the post in September 2003, Ms Harwerth has attended monthly board meetings for all three Infracos and other meetings about asset management and safety. She told us that the challenges the parties face in making these deals work mirror those in other deals that involve the bringing together of different organisations, in particular:

- the need to bridge traditionally commercial and non-commercial cultures;
- the need to set the right tone in the early years of the contracts, for instance in the approach to the management of old assets;
- the need to co-ordinate effectively at interfaces where several parties are involved;

Ms Harwerth also told us that in order to provide effective oversight she would need reliable information from all parties and to better understand LUL's expectations about Infraco work programmes.

B4.3 | Transport for London is the main point of public interest oversight, although again it is too early to assess its oversight impact

Under the Greater London Authority Act, Transport for London is the public sector body with primary responsibility for ensuring that in running the PPPs the public interest is protected. TfL act with first duty to London residents, and it is seeking to ensure effective oversight in a number of ways. The Board of TfL monitors the performance of LUL and seeks to ensure that it delivers the Mayor's strategy for the Tube. Any significant transaction by LUL requires clearance by either the TfL board or the London Transport Commissioner, depending on its value. TfL have put in place a number of financial controls and conducts a rolling audit programme of different aspects of the PPPs. TfL also supports LUL by providing specialist services such as financial expertise.

Whether TfL's oversight role will work successfully will take time, and good information, a point that is covered in more detail in Section A3

B4.4 | The Department for Transport is keeping the annual grant to LUL under review, but has limited levers over TfL

In February 2003, the Department set out its intentions to provide LUL with a grant of £1-1.1billion per year for the first 7½ years of the contracts, a rate set to allow LUL to build up a reserve provision of approximately £170 million by 2006-07 to manage financial pressure in any year. The level of grant is to be monitored regularly and re-evaluated each two yearly Spending Review (for the subsequent three year period), at 7½ year review, and in the event of the risk provision being used up. The Department are monitoring progress through examination of LUL's 4-weekly performance reports and face-to-face meetings with Transport for London, but recognise that they have only limited levers over LUL and its running of the PPPs:

- Annual determination of the grant to TfL
- Restrictions on TfL's ability to contract out certain services without Secretary of State approval
- Restrictions on disposal of operational land by the Mayor
- General liaison with the Mayor, TfL and LUL

B4.5 | The Arbiter will provide oversight at extraordinary and periodic review, but only if required

If called upon, at Periodic Review every 7½ years or (in limited circumstances) more frequently, an independent Arbiter will help with contract re-pricing. He may also, if asked, provide guidance at any time and to an extent that he feels is appropriate - *see Section C1* for more detail.

C | CONSTRAINTS

There are limits to what the signed deals can achieve


Metroline

C1 The price, scope and funding of the PPPs are reviewed every 7½ years

C1.1 | The price, scope and funding of the PPPs are reviewed every 7½ years

Price

The price of the deals is reviewed every 7½ years by the parties. If the parties are unable to agree a price for the next period of 7½ years then the issue may be referred to an Arbiter - see Arbiter review below.

Scope

The signed contracts provide for a limited amount of change to the existing scope of work that the Infracos undertake (see case example 3 - scope changes). The agreement of any new scope at Periodic Review not envisaged at contract close - due to LUL changing its requirements - would need to be negotiated with the Infracos, and would be complex. LUL fear that constraints on its charge rights will make it hard to secure value for money and optimise services for customers, although the Department take comfort from the role of the Arbiter in price-setting.

Funding

The Infracos have secured finance in respect of their obligations falling within the fist review period. At a review, there is no obligation on the funders to provide further finance but there is an incentive for the lenders to stay within the deal if LUL does not significantly change the scope or the risk profile.[10] Separately from the contractual Periodic Review process, the Department for Transport assesses the affordability of the PPPs with Transport for London, as it does on an interim basis during the first 7½ years, and agrees a future grant for work on the Tube infrastructure. TFL is concerned about the absence of guaranteed funding to meet the current scope of the PPP contracts. The Department believes that TfL has been given an unprecedented level of commitment over future funding levels, as set out in its "comfort letter" to the private lenders and investors.

10 See Were they good deals? HC 645, June 2004, paragraph 4.3

The PPP contracts run for 30 years, but are subject to review at least every 7½ years. Is there likely to be significant change to the deals at these reviews?

ARBITER REVIEW

The Arbiter (currently Chris Bolt) is an independent authority appointed by the Secretary of State for Transport to re-set the financial terms of the PPPs and the costs to be recovered under them. A key task is to fix the price required by an "economic and efficient" Infraco to make contractually agreed rates of return.

Rationale for an Arbiter

The Arbiter was created to help with contract re-pricing

1 The bidders were not asked to provide 30 year funding and LUL wanted flexibility to vary contract terms at set times, and to alter performance outputs to deal with discrepancies or improve incentives.[11] The parties agreed therefore to submit the contracts to periodic review every 7½ years. The Arbiter was created in the 1999 Greater London Authority Act to help facilitate this review, but also to manage extraordinary reviews and provide guidance as and when required - see **Figure 13** for more detail.

2 Chris Bolt took up the post of Arbiter in December 2002. He is on a 4-year contract and has a budget of £1.6 million in 2004-05. Two of his staff were closely involved in the negotiation of the PPPs on the public sector side.

The Arbiter is not a regulator

3 The roles of Arbiter and Regulator have some similarities. Both review prices periodically and promote economy and efficiency while balancing the need of private companies to plan for future investment and make returns on their investment.

4 However, regulators have broader powers such as promoting competition, granting licences, adjudicating disputes and can limit the prices a regulated company can charge for the services it delivers, usually via the Retail Price Index - X mechanism, where X is the charges limit set by the regulator. They also can enforce standards of delivery.

5 The Tube Infracos are not seen in the same way as the regulated industries and therefore are viewed as needing a different sort of oversight. For example, the Arbiter has no role to play in protecting individual customers - this is the role of LUL and TfL.

11 It was LUL's assessment, after taking advice, that poor value for money came from asking for a 30 year fixed price. The bidders were therefore asked to provide firm prices for the first 7½ years.



13 THE ARBITER: ROLES AND TIMING

1. THE PERIODIC REVIEW

LUL and INFRACOS

i **18 months before periodic review** - LUL provides the Infracos with its restated terms and any affordability constraints it may have.

ii **At least 12 months before periodic review** Infraco responds by stating whether it can finance the restated terms, whether the risk profile has changed, and whether it needs new finance.

Agree → **Restated Terms** (take effect from review date)

Disagree

Possible objections

- Infracos contest whether LUL has complied with its obligations in setting the restated terms
- LUL or Infracos dispute a fair price for the restated terms

If parties choose

CONTRACTURAL DISPUTE RESOLUTION PROCEDURE
To discuss appropriateness of restated terms

THE ARBITER

Decides the new Infrastructure Service Charge - the economic and efficient price for the Restated Terms. He can also be asked for direction on

- the new finance required,
- a change in the level of risk for Infracos,
- capability to finance the changes,
- the appropriate rate of return of new equity,
- unavoidable adverse effects.

i Parties agree to disagree with the Arbiter and come to a different solution

ii Parties agree with the Arbiter's decision

iii One party disagrees - Arbiter's ruling is binding

2. OTHER KEY ROLES

GUIDANCE/DIRECTION

i Parties can ask the Arbiter for guidance on any matter relating to the contract.

ii (From 2004/05) if asked, the Arbiter reviews annually whether Infraco SSL and BCV are operating "economically and efficiently".

iii Direction on JNP Infraco's Net Adverse effects over and above £50 million (see Paragraph 7).

EXTRAORDINARY REVIEW

In certain adverse circumstances (e.g. major cost overruns on a line upgrade), the Arbiter reviews the contracts such that the parties are in a position to continue operating the contracts.

Source: NAO, derived from PPP documentation

Arbiter review in practice

The Arbiter may act at periodic review or at other times (in limited circumstances)

6 The Arbiter's involvement at Periodic Review is set out in Figure 13. If LUL and the Infracos cannot agree a price for the delivery of services in the restated terms for the next 7½ years, they may ask for help from the Arbiter in resetting the Infrastructure Service Charge (ISC). The new ISC must compensate an economic and efficient Infraco for project costs and enable a rate of return on equity as agreed at contract signature, assuming the Infracos exceed their performance benchmarks - Infraco JNP: 26 per cent; Infraco BCV: 18.3 per cent; and Infraco SSL: 18.2 per cent.[12]

7 Figure 12 also shows that the Arbiter may get involved with an Extraordinary Review, caused by adverse circumstances such as cost overruns on a line upgrade or sustained underperformance on train availability. In addition, Infraco JNP can ask the Arbiter to give direction as to the amount of Net Adverse Effects (or additional costs while acting "economically and efficiently") once this figure has reached £50 million. The Metronet PPP agreements include a specific provision that the Arbiter's guidance can be sought annually, as from April 2005, for a reasoned report on whether or not the Infraco has "performed its activities in an overall efficient and economic manner and in accordance with Good Industry Practice."[13]

8 Infracos and LUL can also refer to the Arbiter for interim referrals for guidance as to how a matter is likely to be treated at the next Review Period or on any matter contained in the contract not just that relating to price. For example, he may be asked to give directions on dividend payments in excess of contractual limits.

The Arbiter's remit depends on the extent the parties want him to be involved

9 The Arbiter is bound by statute to take into account matters which the parties have indicated are ones to which he must have regard - including guidance prepared by the parties - but, so as to balance the different parts of his statutory duties, he may choose to depart from that guidance if he felt that necessary to best meet his overall statutory duty. However, while he has statutory rights to information held by the partners, their associates and related third parties, the Arbiter's directions can be ignored, if both parties agree.

The Arbiter must determine an "economic and efficient" price

10 A key role for the Arbiter is to determine the "economic and efficient" price for the delivery of services. This involves the concept of a notional Infraco which acts in an economic and efficient manner and in accordance with good industry practice, and has the same sub-contracting and funding arrangements as the actual Infracos. There is a separate notional Infraco for each Infraco to reflect the differing structures and obligations of the three Infracos - in the first 7½ years, Tube Lines intends to let all its major contracts competitively, while Metronet's main suppliers are members of the Metronet consortium, with the PPP award process acting as a competitive tender for their sub-contract prices. The Arbiter determines the future service charge based on his estimate of what the cost "should be" for the respective notional Infraco.

11 According to the contracts, good industry practice includes:

- establishing and maintaining whole life asset planning and maintenance regimes; and
- understanding the degraded operation of complex systems so as to ensure controlled degradation.

12 "Economic and efficient" can mean different things in different contexts, and at different times as good industry practice changes. The Arbiter therefore has discretion over what he considers to represent "economic and efficient" in any particularly situation.

"Economic and efficient" can be measured, and interpreted, in different ways

13 Guidance is given to the Arbiter in the contracts as to whether certain costs, such as those for tendered subcontracts, are a fair reflection of the market. Initial work commissioned from Cambridge Economic Policy Associates by the Arbiter and published in 2003, suggested that there were a number of ways to assess the cost and efficiency of an Infraco. This and our own research shows that there could be a range of possible measurement mechanisms, each open to some interpretation:

- Baselining of costs and performance - Measurement of outturn costs against a) an Infraco's financial model (including contingencies for cost overruns); and b) historical LUL information; and measurement of performance against PPP output specification.
- Analysis of input price trends - Assessment of trends in the first period and making reasonable judgements about future input prices at periodic review. The water industry used a related technique on one occasion but Professor Stewart, advisor to OFWAT (the industry regulator), demonstrated that the cost functions changed too much for multi year analysis to be valid. The Competition Commission noted that this technique could be a useful supplement to OFWAT's existing methods of determining efficiency.

12 For more on performance benchmarks, see Section A.
13 Routine Provision of Information to the PPP Arbiter: Initial requirements. January 2004: Office of the PPP Arbiter.

- Internal cost and productivity benchmarking - Using data for sub-divisions of the Infracos, as in the sewerage industry. The Competition Commission have commented that this is a valid approach.[14] The lack of competition in the Tube PPPs - two companies running the three Infracos - may reduce the Arbiter's ability to collect comparative data.
- External cost and productivity benchmarking - OFWAT used this method in the past but their experience has shown that the data available on overseas companies is not always sufficiently comparable to companies in England and Wales for the work to be directly usable in price review assessments. This method may also have weaknesses in this case given that most international underground systems are operated by the state rather than by private companies and that LUL's network is one of the oldest, largest and most complex underground systems in the world.
- "Components of work" analysis - To identify engineering good and bad practice on discrete elements of work and benchmark Infraco performance accordingly.

The existence of an Arbiter creates a pricing risk, but the Arbiter is seeking to reduce this uncertainty through early and open engagement with the parties

14 The existence of Arbiter poses risk for each party. He could, in theory, decide a price level that is unfavourable to the Infracos. Or he could reach a pricing direction that does not suit LUL. He must take into account the Infracos' need to fund long term investments and allow the Infracos to make the rate of return agreed in the contract, while ensuring that they meet the criteria of economic and efficient behaviour. He therefore must take an independent view on matters referred to him.

15 He has sought to reduce risks to the parties by issuing two new policy documents in January 2004 that set out how his office will go about its work - 'The PPP Arbiter: Role, approach and procedures. A policy statement.' and 'Routine Provision of Information to the PPP Arbiter: Initial requirements.'[15]

16 The Arbiter has adopted the following aim for his office:

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:

- 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.

17 Any technical reports that the Arbiter prepares during the course of a reference will generally be confidential to the parties to a reference. Reports which assess, for example, economy and efficiency, and use information from all Infracos in benchmarking would be made available to all PPP parties to ensure an equal understanding of the Arbiter's approach. The Arbiter will publish guidance and directions in full, along with such additional information as is appropriate to give an understanding of the conclusion he has reached.

18 The parties will need to provide the following information to the Arbiter, which together are intended to allow the Arbiter to give an early warning of potential Extraordinary Reviews and take an initial view on the economy and efficiency of the PPP parties:

- Historical - Information supplied to bidders; supply chain, subcontracting and partnering arrangements at transfer; details of estimated risks and associated contingencies
- Core monitoring - Agreed changes to the contracts; performance information (day-to-day and monthly); capital project progress; asset management strategies, plans and analyses; high level actual and forecast costs and revenues;
- Other - Evaluation of competitive tendering for major new subcontracts (contracts with a value in excess of £15 million); variations to major subcontracts (where the variation exceeds 10 per cent); material variations to funding arrangements; risk registers and risk management processes; summary board level reports.

19 The Arbiter plans to present a further paper later in 2004 describing the analysis that will be undertaken on the initial routine information, for discussion with the PPP Parties and subsequent publication. This is intended to ensure that the analytical framework that the Arbiter applies is transparent and properly understood.

14 *Competition Commission, report on Vivendi Water UL plc and First Aqua (JVCo) Limited: A report on the proposed merger", p.30.*

15 *The first document was based on public consultation, in particular correspondence with London Underground Ltd, Metronet, Tube Lines, European Investment Bank, London Transport Users Committee, Office of the Rail Regulator, John Biggs (London Assembly member) and Charles Yates. The second document was commented on by the PPP parties.*

C2 Some Tube services are provided outside the PPPs

C2.1 | There are PFI deals outside the PPPs that deliver tube services

Examples, all signed in recent years, include:

- Power (managed by TfL) – under a 30 year, £1.2 billion PFI contract signed in August 1998, SEEBOARD Powerlink is managing, maintaining, developing and financing London Underground's power supply system. Power requirements are now met entirely from the National Grid. Proceeds of up to £67 million from the sale of the Lots Road power station, which previously provided power for London Underground, provide revenue to cover most of the new expenditures.
- Northern Line trains (managed by Tube Lines) – a 20 year contract signed in April 1995, worth £1.1 billion with Alstom for the delivery of a new fleet of Northern Line trains.
- Ticketing – a 17 year, £1.1 billion contract with Prestige, signed in August 1998, to provide and maintain a new ticketing system for both the London Underground and other London transport services.
- Policing (managed by TfL) – a 23 year contract signed in March 1999, worth £50 million, for the construction of new police station facilities for British Transport Police and for related support services (relevant just to Infraco JNP).
- Communications (managed by TfL) – a 20 year contract with Connect, signed in November 1999 and worth £1.2 billion, to provide an integrated radio and communications service across the whole of the Tube, including interfaces with emergency services.

Where LUL has retained risk in these deals, should the risks materialise there are potential knock-on effects on what funds are available to bring about any new changes to the Tube PPPs. There is also a significant interface risk, for example, where improvements under the PPP are tied to power upgrades that are to be undertaken by PFI contractors, or where the PFI contractors need to agree the upgrades.

C2.2 | Other components of the Tube are not managed through the PPPs

Examples include:

- LUL's Property estate – or example, the shops, restaurants and staff facilities provided in and around London Underground stations.
- Security – LUL works with the British Transport Police to provide a number of services, including the prevention of terrorist attacks on the network.
- National network interfaces – LUL, Network Rail and the Train Operating Companies provide limited train and/or station services to each other on discrete parts of the LUL network.

C3 The Tube will be affected by wider transport strategy

The PPPs were developed through a government strategy to improve transport in London. What if such strategies change - will they affect the Tube?

The performance of the Tube will be influenced in part by regional and national transport strategies.

C3.1 | The Mayor's transport strategy for London

The Mayor of London is responsible for developing a 10 year strategic framework for transport in the capital. This framework, most recently published in July 2001, may impact on the Tube in a number of ways:

- Expenditure on buses – the Mayor's strategy is to make radical improvements to bus services across London, including increasing the bus system's capacity, improving reliability and increasing the frequency of services. The initiatives were intended, among other things, to relieve usage pressure on the Tube.
- The range of the congestion charge – the charge is aimed at reducing the volume of traffic, thereby reducing congestion and car dependency and improving journey time reliability for continuing car users. LUL estimate that since the introduction of the congestion charge there is an increase of about 1% in trips to Tube stations serving the charging zone. This is estimated to amount to about 2,000 additional passengers in the morning peak hour. The Mayor has plans to extend the congestion charge westwards by the end of 2005, and this is likely to further impact on the demand for Tube travel.
- Other rail lines – preliminary works have started on extending the East London Line linking Clapham Junction and West Croydon in the south to Dalston and Highbury. Other projects include the development of Metro style services on strategic lines, the extension of Thameslink 2000 and Crossrail. Again, these developments will be likely to affect Tube demand.
- Social inclusion strategies – the Mayor is seeking to promote greater access to public transport for the economically and physically disadvantaged in London, and the direction of expenditure for these purposes will likely have an impact on the level and nature of Tube usage. The achievement of these strategies will, of course, depend on whether funding is available.

C3.2 | National transport strategy

The Department for Transport works towards a similar 10 year plan for transport across the whole country. Examples of activities that may affect the Tube include:

- Level of spend on commuter rail lines - which will impact upon capability and availability of alternative transport routes to the Tube, and passengers' willingness to use them instead of or in conjunction with the Tube.
- Improved interchanges between national rail and London Underground - e.g. at Walthamstow Central, Paddington and Euston.
- Increased capacity at Kings Cross - to cope with extra passengers arriving at the station when the new Channel Tunnel Rail Link is completed.

As with the Mayor's strategy, expenditure in these areas will depend on whether funding is available.

| GLOSSARY

Abatement | A deduction from the service charge that LUL pays to an Infraco due to performance worse than that agreed in the contract.

Ambience | A performance measure covering the quality of the environment for passengers, including the cleanliness and general condition of trains and stations.

Arbiter | An independent authority appointed by the Secretary of State for Transport to resolve disputes between the parties on the financial terms of the PPPs and the costs to be recovered under them - at Periodic Review, but possibly other times.

Availability | A measure of passengers' total additional journey time resulting from train service or station disruption (see also Lost Customer Hours).

BCV | Bakerloo, Central, Waterloo & City, and Victoria lines. Now the responsibility of Metronet.

Capability | A performance indicator that measures the infrastructure's ability to support train services. It is based on average journey time per passenger, for a given time of day, and for a given line or part of a line and includes Journey Time Capability, Service Consistency and Service Control.

Comfort Letter | A letter of awareness issued by the Secretary of State to senior lenders to each of the three PPPs. The comfort letter sets out the amounts of debt and indicates that he would consider re-setting the transport grant in various circumstances where London Underground cannot meet its obligations. The comfort letter also recognises the possibility of the transport grant being insufficient to meet the potential sums due on termination and that he would not "stand by and do nothing in those circumstances".

Corrective action notices | Notices that LUL gives to the Infracos in the event of continued poor performance, specifying times to remedy contract performance.

Fault attribution | All incidents go through the fault attribution process, which are inputted on-line with a specially designed computer system and which attributes responsibility to LUL or an Infraco on the basis of pre-determined rules.

Fault rectification | The speed and quality of fixing faults with for example Help Points, Dot Matrix Indicators and CCTV.

Greater London Authority (GLA) Act 1999 | The act that established a Mayor for London, with associated powers over affairs such as transport and policing.

Grey assets | Assets that are in unclassified condition at the start of the PPPs, and which the Infracos must classify by the first periodic review in 2010.

Health and Safety Executive | The statutory body established by the Health and Safety at Work etc. Act 1974, responsible for accepting and enforcing London Underground's railway safety case (the document which describes how LUL manages safety).

Infrastructure companies (Infracos) | The three organisations (Infraco BCV, Infraco JNP and Infraco SSL) responsible for delivering infrastructure services to London Underground under the PPP contracts.

Infrastructure | Railway, trains, stations and depots on London Underground's network (including track, signals, tunnels, bridges, embankments, platforms, escalators, lifts).

Infrastructure service charge (ISC) | The amount payable under the PPP contract by London Underground to the Infraco, adjusted periodically as set out in the Service Contract, as agreed between the parties, or determined by the Arbiter at Periodic Review. The ISC covers the Infraco's costs of maintaining, renewing and upgrading the infrastructure, including overheads, profit and financing costs.

JNP | Jubilee, Northern and Piccadilly lines. Now the responsibility of Tube Lines.

London Regional Transport | A nationalised industry previously responsible for London Underground and answerable to the Department for Transport.



London Underground | (previously a subsidiary of London Regional Transport, now part of Transport for London) - Body responsible for operating passenger trains and stations and for passenger safety.

Lost Customer Hours (LCH) | The amount of customers, "lost" time due to severe disruption, calculated using a weighted formula to reflect the number of passengers likely to be travelling on the affected part of the network when the delay occurs.

Major Enhancements | Changes to the scope of the contract and of negotiable value, where design, feasibility, etc. are required and which the Infraco is not mandated to deliver.

Metronet | A joint venture comprising Atkins, Balfour Beatty, Bombardier Transportation, EDF Energy (formerly SEEBOARD) and Thames Water, with responsibility for Infraco BCV and Infraco SSL.

Partnership Director | A non-executive director, appointed by London Underground, who sits on the board of all the Infracos and has a mandate that includes ensuring good communication and co-operation between the parties.

PFI | Private Finance Initiative. A policy introduced by the Government in 1992 to harness private sector management and expertise in the delivery of public services, while reducing the impact of public borrowing.

PPP | Public Private Partnership. In this case, the partnership between the public sector London Underground and three private sector infrastructure companies under the 30-year PPP contracts.

Rolling stock | Trains, cabs, coaches, locomotives, self-propelled mechanical plant and other vehicles which can operate alone or together on the track, together with all powered and unpowered Track trolleys.

Periodic review | A provision in the PPP contract which, every 7½ years, allows London Underground's payments to the Infracos to be reset to take account of changed circumstances and cost increases that an "economic and efficient" Infraco would incur.

Safety Case | The statutory safety case prepared by LUL as a train operator that sets out how LUL will manage passenger safety. The Safety Case must be accepted by the Health and Safety Executive in compliance with the Railways (Safety Case) Regulations 2000.

Service points | Service Points are allocated to the Infracos for failures to meet certain requirements of the performance specification. The level of abatement is £50 per Service Point. Service Points are used to incentivise Infracos to fix reported faults.

Shadow running | A three year period preceeding the closure of the PPP deals during which the PPP framework was trialled and modified.

Specified right | LUL specified rights' are defined in the PPP contracts and cover a number of projects that were not included, because they were insufficiently defined or there was uncertainty about whether LU would wish to proceed with them.

Step-in rights | If the Infraco fails to comply with a Corrective Action Notice, LUL can take steps itself to remedy the problem, or ask another Infraco or a third party to do so. LUL also has emergency step-in rights.

SSL | Circle, District, Metropolitan, East London and Hammersmith & City lines. These lines are only just below ground level, having been built in 'cut and cover' tunnels, and are now the responsibility of Metronet.

Transport for London (TFL) | The body created under the Greater London Authority Act 1999, which took over responsibility for London Underground operations from July 2003.

Tube Lines | A joint venture comprising Amey, Bechtel and Jarvis, with responsibility for Infraco JNP.

1 | APPENDIX Methodology

1 In December 2000, the National Audit Office reported on the extent to which London Underground's initial financial analysis resolved the value for money test against which the Department for Transport sought to assess the Tube Public Private Partnerships. This report, together with a second report we published today, takes our evaluation of the PPPs through to May 2004, as follows:

- Were they good deals? - Covers the period from 1998 to contract close in December 2002 (for Tube Lines) and April 2003 (for Metronet)
- Are the PPPs likely to work successfully? - Covers the period from first contract close in December 2002 to May 2004.

Methods matrix

2 We used a variety of methods to undertake our examination, from qualitative approaches such as document review to the quantitative method of statistical analysis, aimed collectively at ensuring logical rigour and technical robustness in the final report. Table 1 shows the different methods we used, by study phase:

Explanatory notes

Note 1 - The Issue Analysis/Dinner Party approach (IADP™)

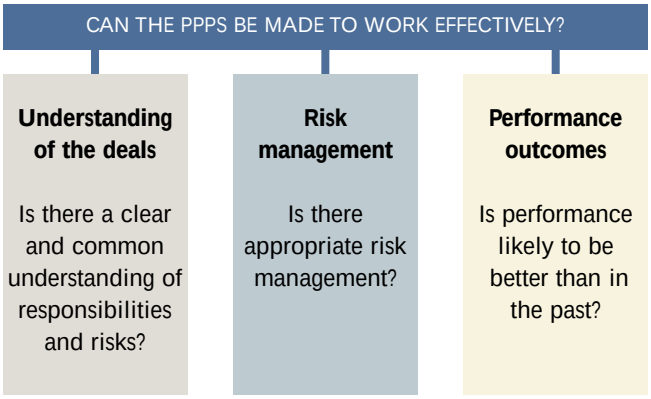
3 The Issue Analysis/Dinner Party approach (IADP™) is a methodological framework developed by the NAO as a means to deliver audit reports that are focused, logically rigorous and built on consensus.[16] It helps structure an audit programme around which to base evidence collection and analysis (the aim of the issue analysis) and organise the resultant report in a clear and logical way (the aim of the Dinner Party™).

1 METHODS MATRIX

Method	Study phase: Issue identification	Audit programme	Evidence collection and analysis	Report drafting	Report design
Stakeholder interviews (e.g. LUL; Infracos; HSE)	✖		✖		
Brainstorming	✖				
Internet research	✖				
Issue Analysis (see note 1)		✖			
Statistical analysis (of performance outcomes)			✖		
Review of key documents (e.g. PPP contracts; board minutes; Tube incident reporting forms)			✖		
Case examples (included document review and interviews with LUL and Infraco staff)			✖		
Focus groups (with Tube staff at all levels)	✖		✖		
Dinner Party™ (see note 1)				✖	
Cognitive mapping (see note 2)				✖	
Storyboarding (see note 3)					✖
Consultation with expert panel (see note 4)	✖	✖	✖	✖	✖

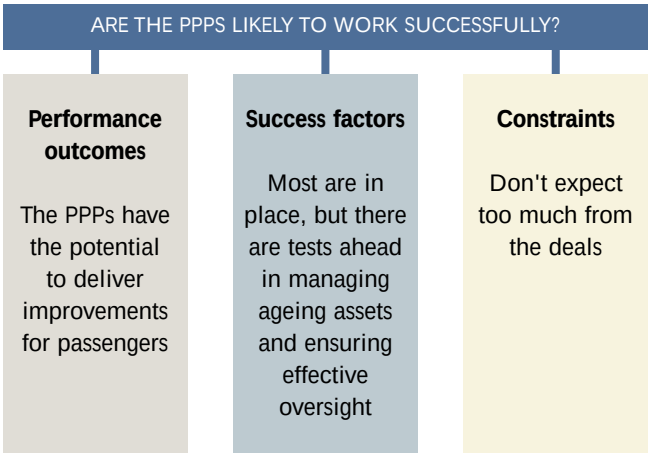
16 *The approach is based in part on theory contained in The Pyramid Principle, by Minto B. (2002), 3rd edition, Harlow: Pearson Education, and the principles of argument mapping as for example set out in Horn, R.E., Yoshimi, J., et al. (1998) Mapping Great Debate: Can Computers Think?, Bainbridge Island, WA: MacroVu, Inc.*

4 Issue analysis produces a series of yes/no questions that terminate in audit tasks that indicate what hypothesis the auditor should seek to test and what method of data collection and/or analysis he or she should use. The high level questions that we based this audit around were as follows:



For each of the top level questions, we set a subsidiary group of questions, linked logically to the main question, in order to direct our detailed work and analysis.

5 The Dinner Party™ is based around what happens at a real dinner party, when you typically have only a short period of time to hold a fellow guest's attention. The Dinner Party™ meeting takes place after data collection and analysis is complete and the aim is to produce crisp, interesting report conclusions that can each be stated in 10-15 seconds, and to build up more levels of detail on that basis. In this case, the high level conclusions that resulted from the Dinner Party™ process were:



Note 2 - Cognitive mapping

6 Cognitive mapping is a method typically used to generate new ideas, and to seek out relationships between those ideas. The technique is sometimes used in focus groups to capture the thoughts of participants, and arrange them into logical categories on a flipchart or whiteboard. In this case, we used cognitive mapping as a way to develop our recommendations.

Note 3 - Storyboarding

7 We are constantly seeking to improve the accessibility and impact of our reports. With this aim in mind, we used an innovative storyboarding approach to design this report. The approach is widely used in the advertising industry as a means to develop advertisements for new products. In this case, we started with the key messages that emerged at the Dinner Party™ (see para 3) - on the basis of one key message per double page - and reinforced them with summaries of the evidence that we had collected, along with pictures and other graphics wherever possible.

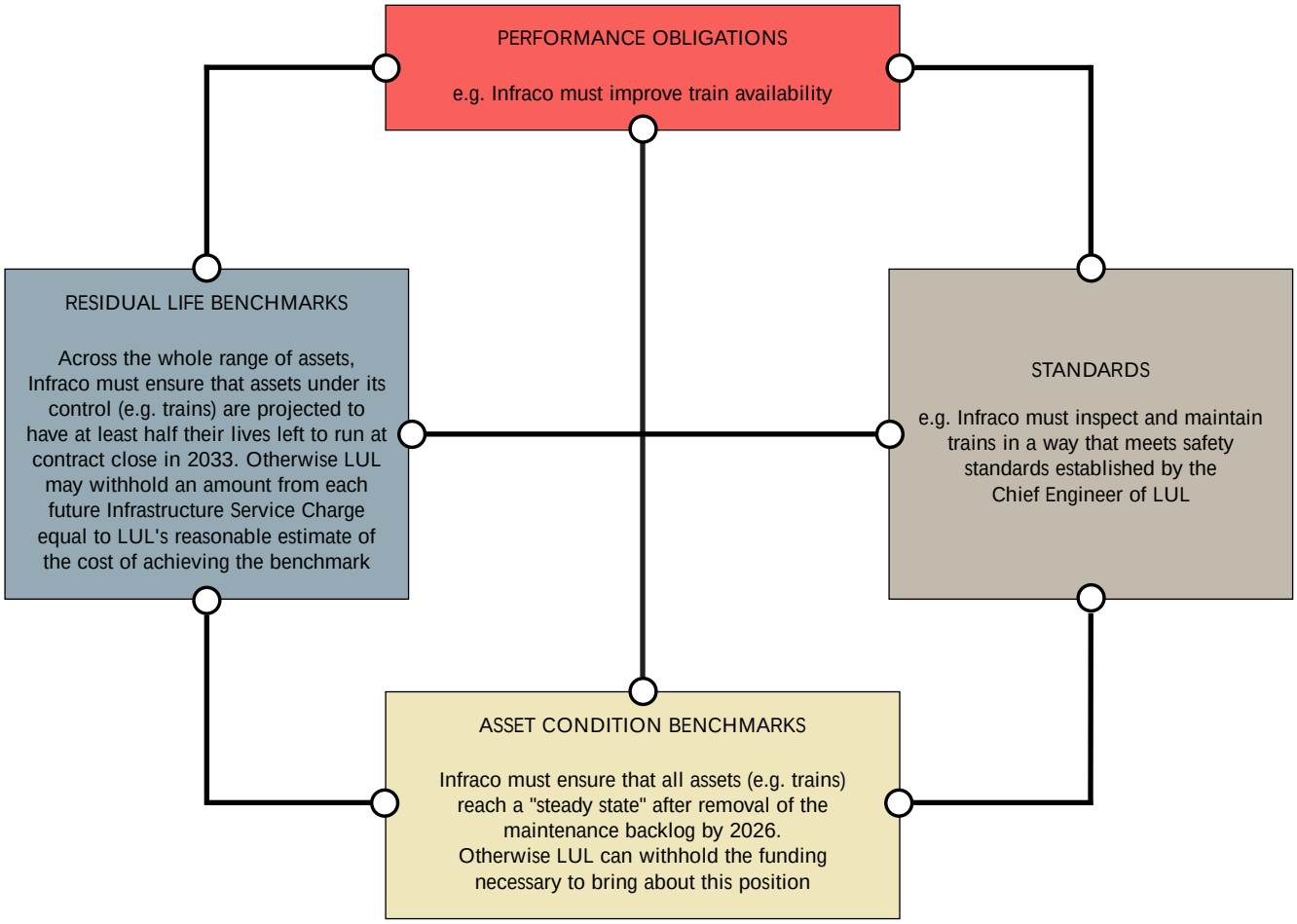
Note 4 - NAO expert panel

8 The Expert Panel acted as a form of quality review through each phase of the study, and contained a range of experts from outside the National Audit Office:

- Anthony Grossman, Director, Centre for Effective Dispute Resolution
- Kingsley Manning, Managing Director, Newchurch Limited
- Professor Tony M. Ridley CBE, FREng, Emeritus Professor of Transport Engineering, Imperial College
- Michael C. Spackman, National Economic Research Associates
- George Steel, Managing Director INDECO (International Management Consultants) Limited
- Bruce O. B. Williams

2 | APPENDIX The PPP performance regime

1 LUL seeks to incentivise the Infracos to bring about an improvement to the Tube's infrastructure and, consequently, passenger service through a combination of contractual conditions: performance obligations, standards, asset condition benchmarks and residual life benchmarks. The chart below provides an illustration of what this means in practice:



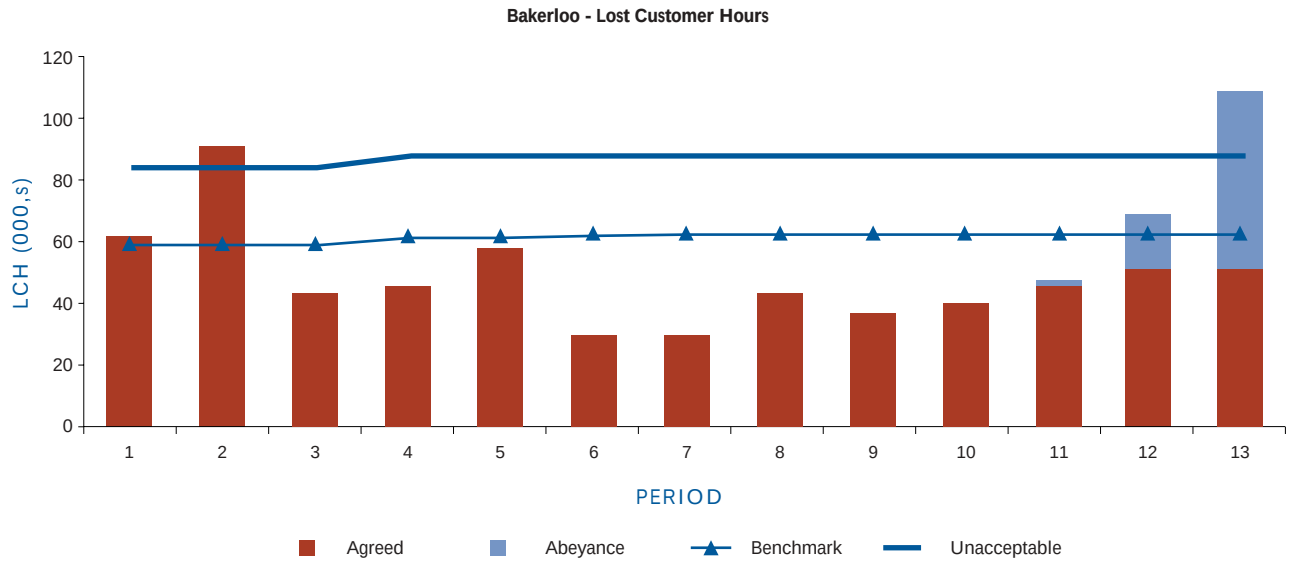
Availability performance in 2003/04 (by line)

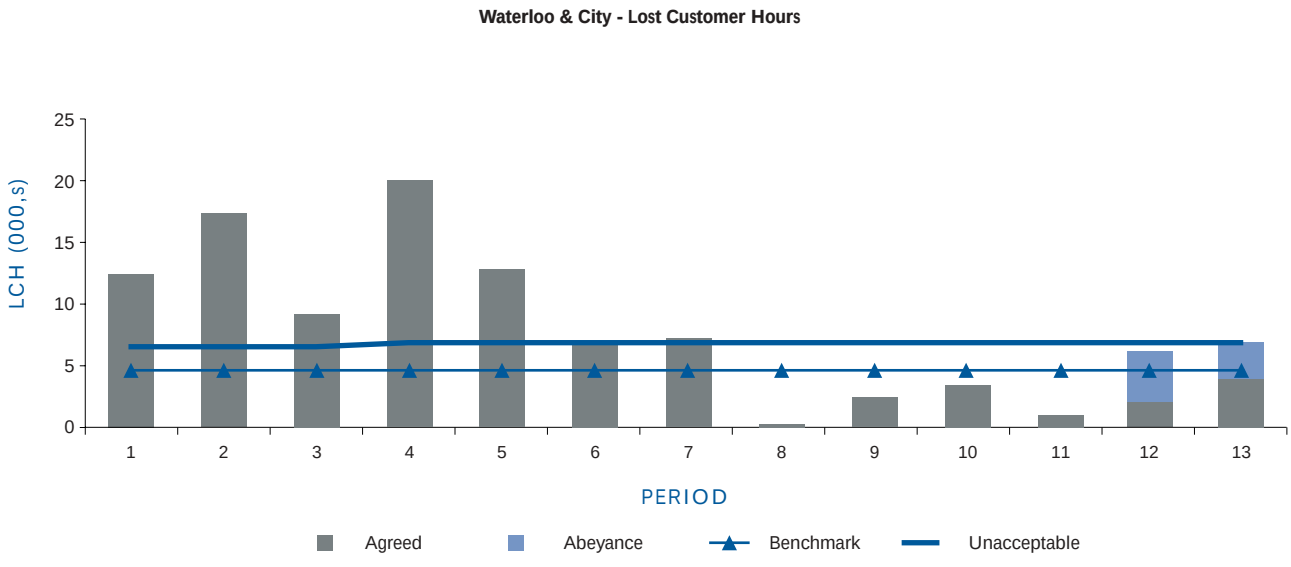
APPENDIX | 3

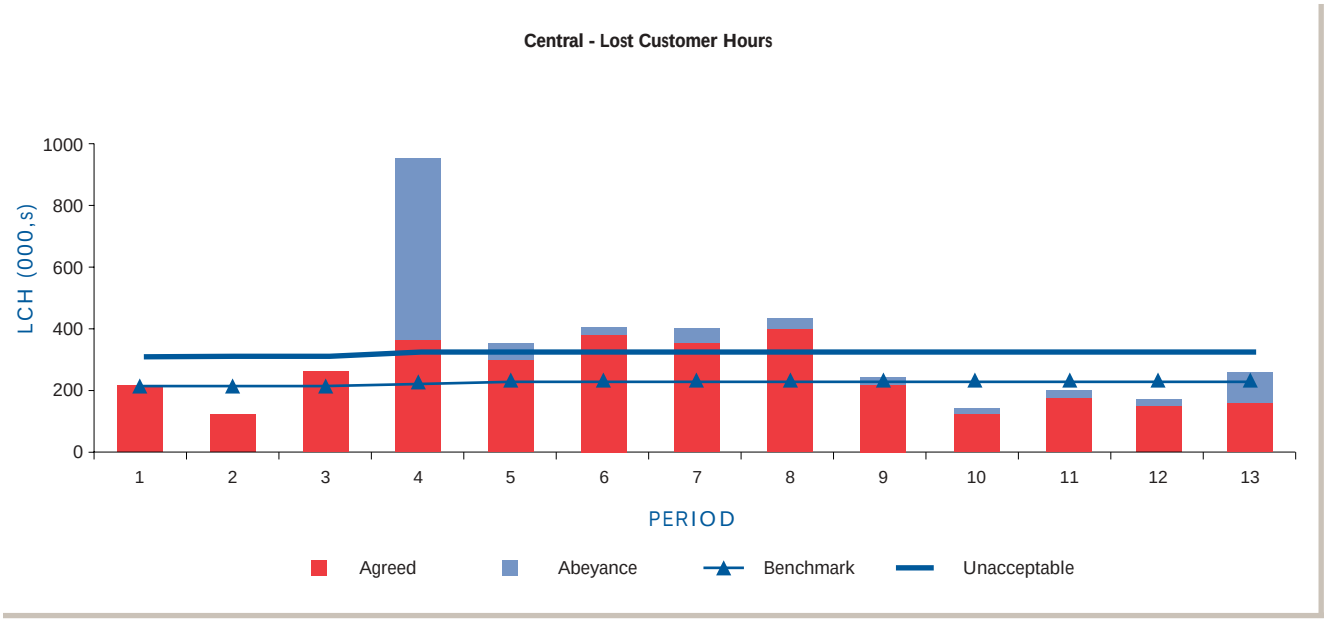
As explained in Section A2 of the report, overall performance against contractual benchmarks in the first year of the PPPs (2003/04 financial year) is mixed. This appendix sets out availability performance at a more detailed level - by individual line. Note that good performance against the contract equates to Lost Customer Hours (LCH) that are below benchmark (i.e. vertical LCH bar ends beneath the horizontal benchmark line)

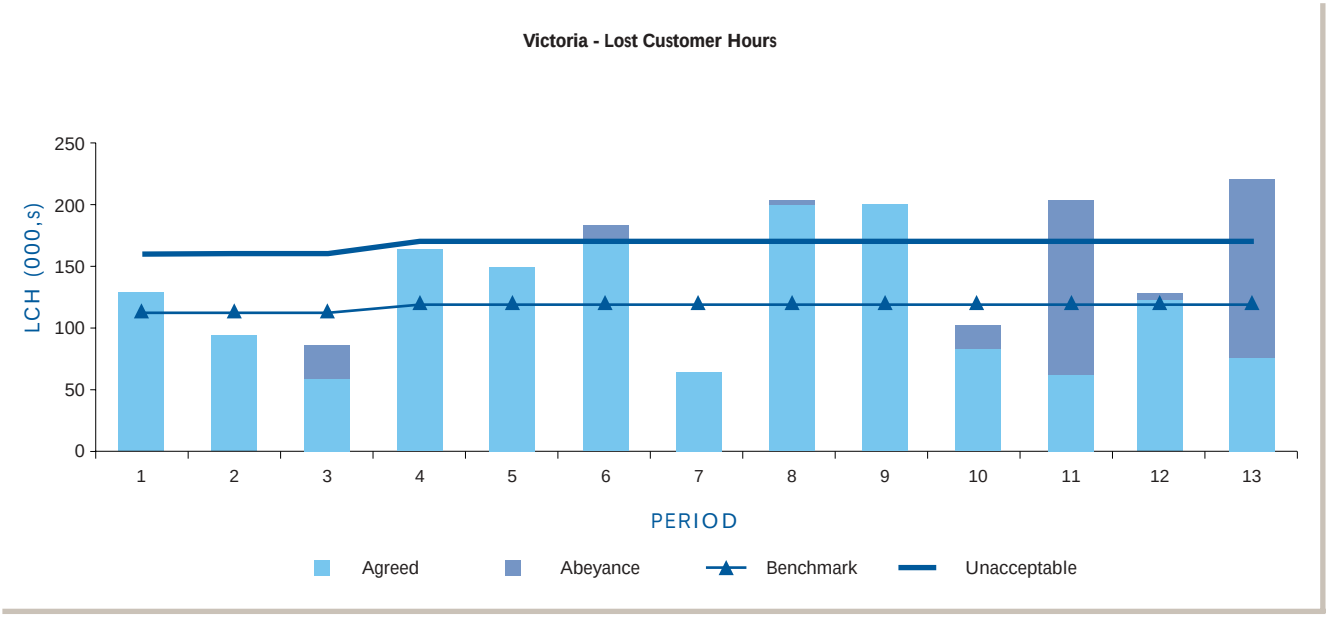
Performance on all lines shows a similar volatility to that which occurred during shadow running. In general, none of the three Infracos has reversed or affected long-term trends in asset deterioration. Whether the Infracos are able to reverse this long-term pattern will depend on the timeliness and quality of upgrade work, most of which - if contractual targets are met - should be delivered between 2007 and 2015 (See Section A3).

Infraco BCV lines





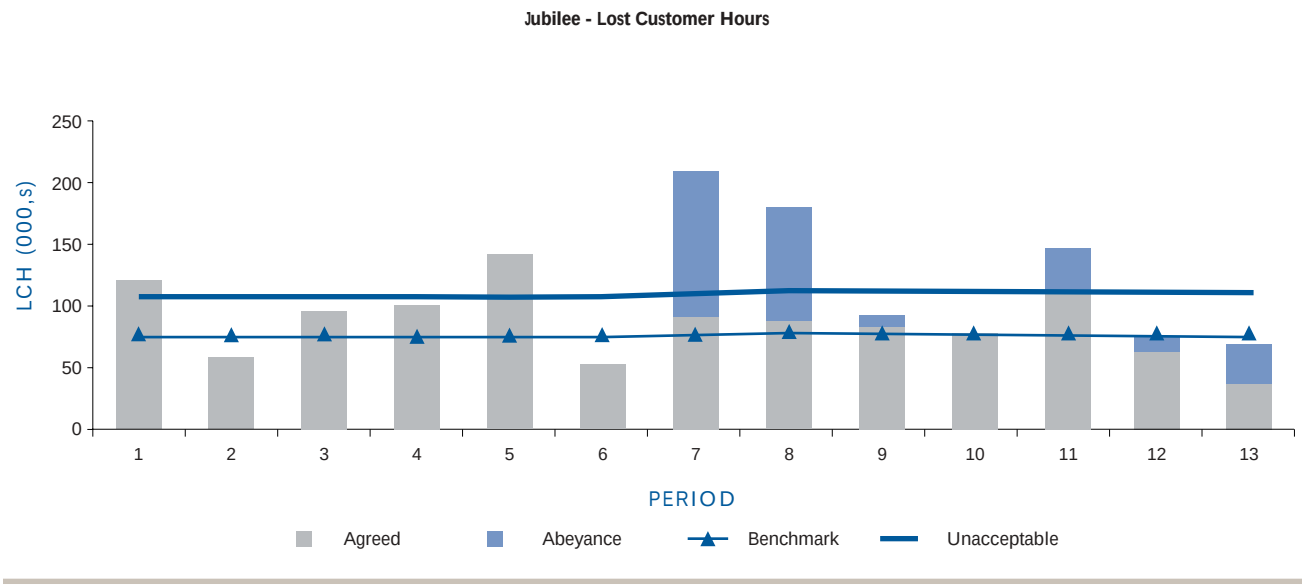


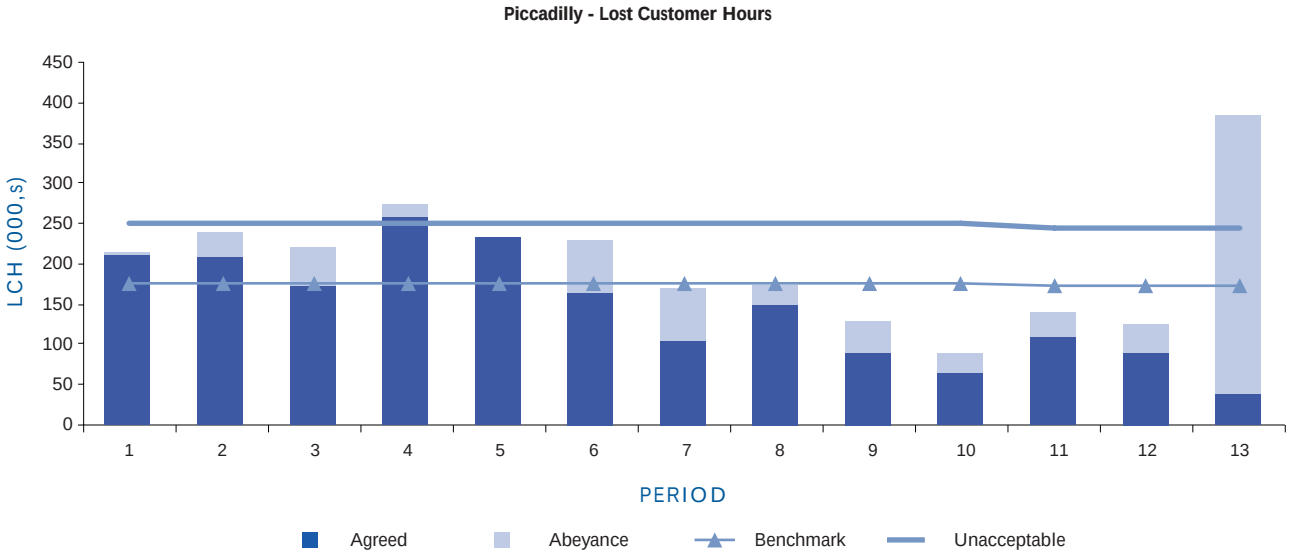


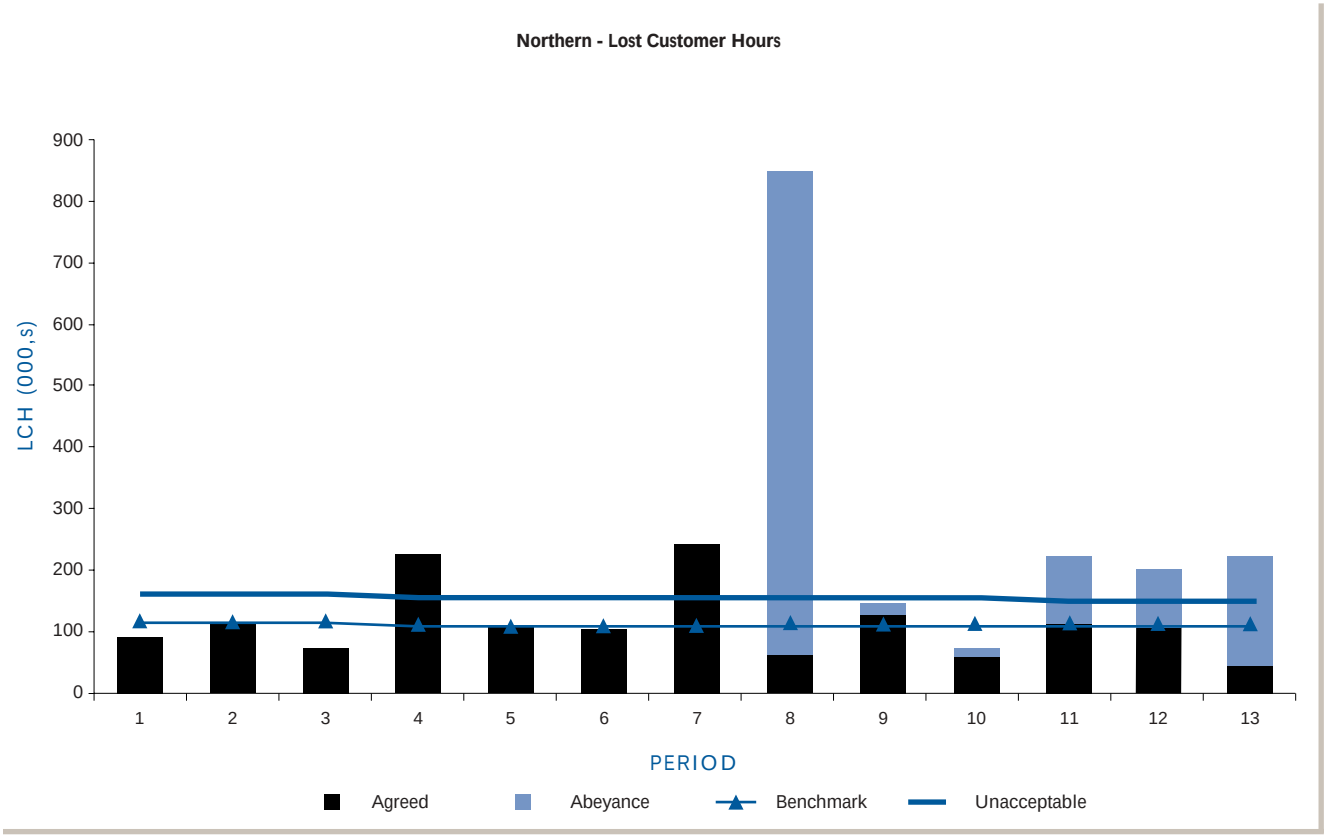
Infraco BCV manages four lines which show variable performance in 2003/04:

- **Bakerloo line** performance was generally better than benchmark due to fewer track problems than previously, but with a trend of increased LCH in the latter periods.
- The **Central line** performed worse than benchmark until period 9. This was due primarily to unavailable or defective rolling stock and line suspensions following the Chancery Lane derailment. In recent periods, performance improved.
- The **Victoria line** showed high levels of variability around benchmark, with recent performance worse than benchmark due to a higher than usual level of defective train incidents and signalling problems.
- The **Waterloo & City** line saw a downward trend in LCH - although due to the small size of the line, a relatively small number of incidents can make performance worse than benchmark.

Infraco JNP lines



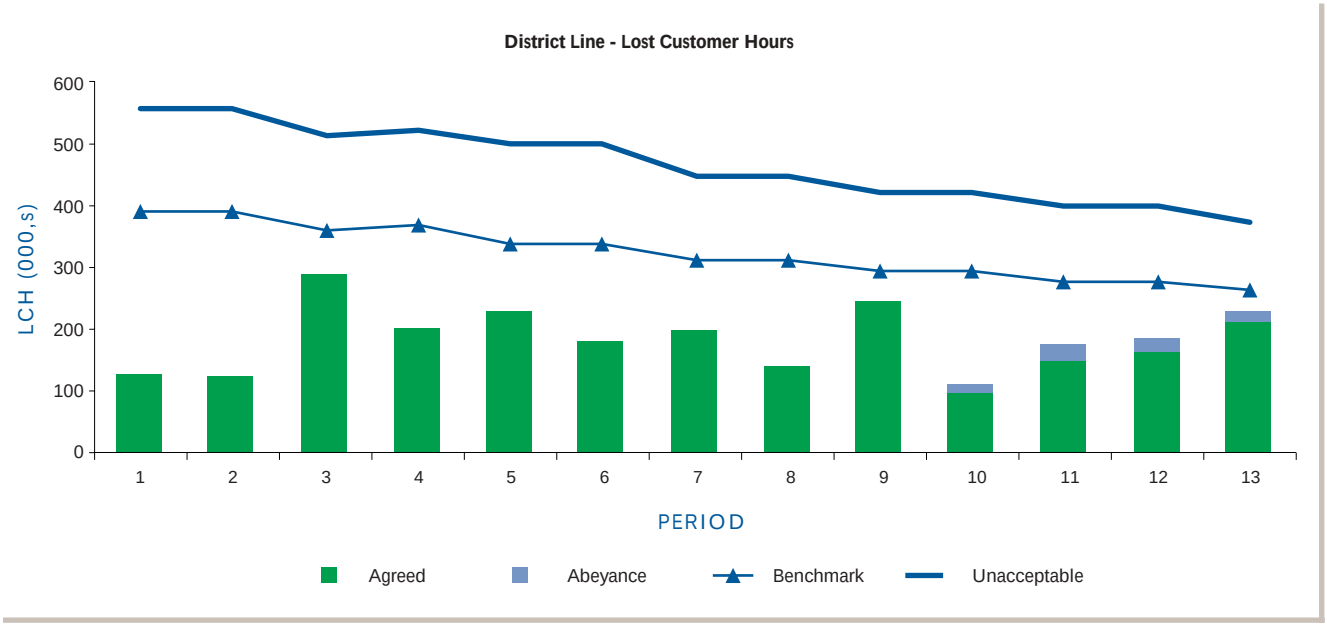




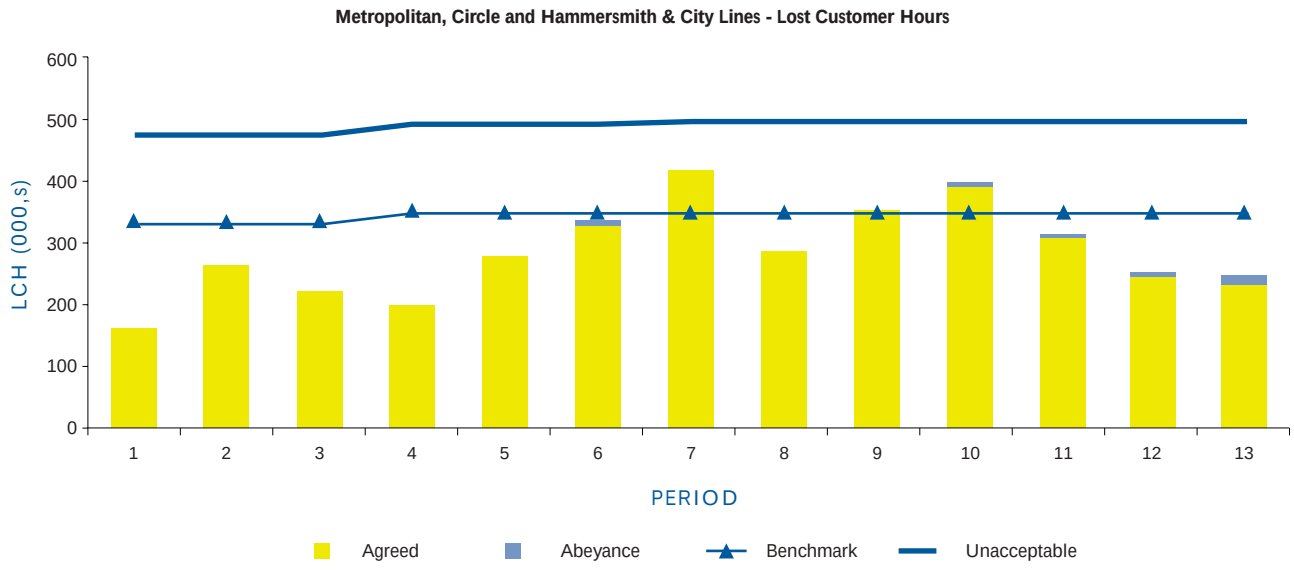
Infraco JNP performance also varied considerably in 2003/04:

- The **Jubilee line** showed a trend of LCH around benchmark, although exceptional incidents like broken rails at St. Johns Wood (11,078 LCH) and a signal failure at Baker St (24,620 LCH) pushed single periods strongly over the benchmark.
- The **Northern line** showed an almost consistent underlying level of LCH, with exceptional incidents strongly affecting single period results. The most notable event was a derailment at Camden Town (see case example 4) and moved the Northern line long term average from better than benchmark to worse than benchmark.
- The **Piccadilly line** performed between benchmark and unacceptable. A significant portion of poor performance was caused by axle box problems subsequently addressed on the rolling stock, although not all LCH resulting from this problem have yet been allocated - see case example 6. In recent periods, performance showed a downward trend, with better than benchmark performance at the end of the year.


East London Line - Lost Customer Hours
LCH (000,s)
0
1
2
3
4
5
1
2
3
4
5
6
7
8
9
10
11
12
13
PERIOD
Agreed
Abeyance
Benchmark
Unacceptable


District Line - Lost Customer Hours
LCH (000,s)
0
100
200
300
400
500
600
1
2
3
4
5
6
7
8
9
10
11
12
13
PERIOD
Agreed
Abeyance
Benchmark
Unacceptable

Infraco SSL lines



Infraco SSL performed better than the other Infracos during 2003/04, with either below or close to benchmark across all lines. However, problems occurred on the **Circle** and **Hammersmith & City** lines where stock defects, mainly due to flat wheels, led to poor performance between Periods 5 and 9. This caused a number of cancellations of peak service trains on these lines.

Note:

1 *The figures above relating to Lost Customer Hours (LCH) are revised each period (28 days in length) as the attribution process reduces the number of LCH in abeyance (still under contractual discussion). A more meaningful picture of performance therefore only begins to emerge at least one or more periods in arrears as incidents are agreed through the fault attribution process (see Figure 9).*