

Finance and Policy Committee

Date: 14 October 2014

Item 10: Independent Investment Programme Advisory Group Annual Benchmarking Report 2013/14

This paper will be considered in public

1 Summary

- 1.1 This paper provides TfL's Management response to the Independent Investment Programme Advisory Group's (IIPAG) Annual Benchmarking Report for 2013/14.

2 Recommendation

- 2.1 **The Committee is asked to note the Independent Investment Programme Advisory Group's Annual Benchmarking Report for 2013/14 and to endorse this management response.**

3 Background

- 3.1 TfL welcomes the continuing support and constructive challenge provided by the IIPAG through its direction of benchmarking. TfL concurs with the IIPAG's view that there has been "good progress" in improving benchmarked performance over the last year. Benchmarking is now mature and embedded across London Underground (LU) Operations and Capital Programmes, Buses and most recently Roads Asset Management.
- 3.2 TfL makes a number of observations and comments on the content of the IIPAG Report, which are summarised below.

4 Management Response

Rail and Underground overall reliability (section 3.3)

- 4.1 Operational performance on the Docklands Light Railway (DLR) is good, using two primary metrics – the Departure score and Excess Waiting Time (EWT). In addition, performance has improved significantly in the last two years:
- (a) the Departure score for 2012/13 (the year on which IIPAG is commenting) was 98.5 per cent, and shows a significant improvement on the prior year (97.7 per cent). Departure losses reduced by a further 57 per cent in 2013/14, reaching an annual score of 99.2 per cent;
 - (b) Excess Wait Time for DLR is currently 0.08 minutes and compares favourably with LU lines; and
 - (c) in addition, DLR reports higher levels of customer satisfaction than LU. Reliability is one of the main drivers of customer satisfaction.

4.2 LU's network EWT was 0.25 minutes. Figure 1 shows the periodic performance of DLR between 2011/12 and 2013/14 and compares it to the LU Network. It is interesting to note that in terms of EWT, performance of the LU's newly upgraded automated lines is similar to the DLR.

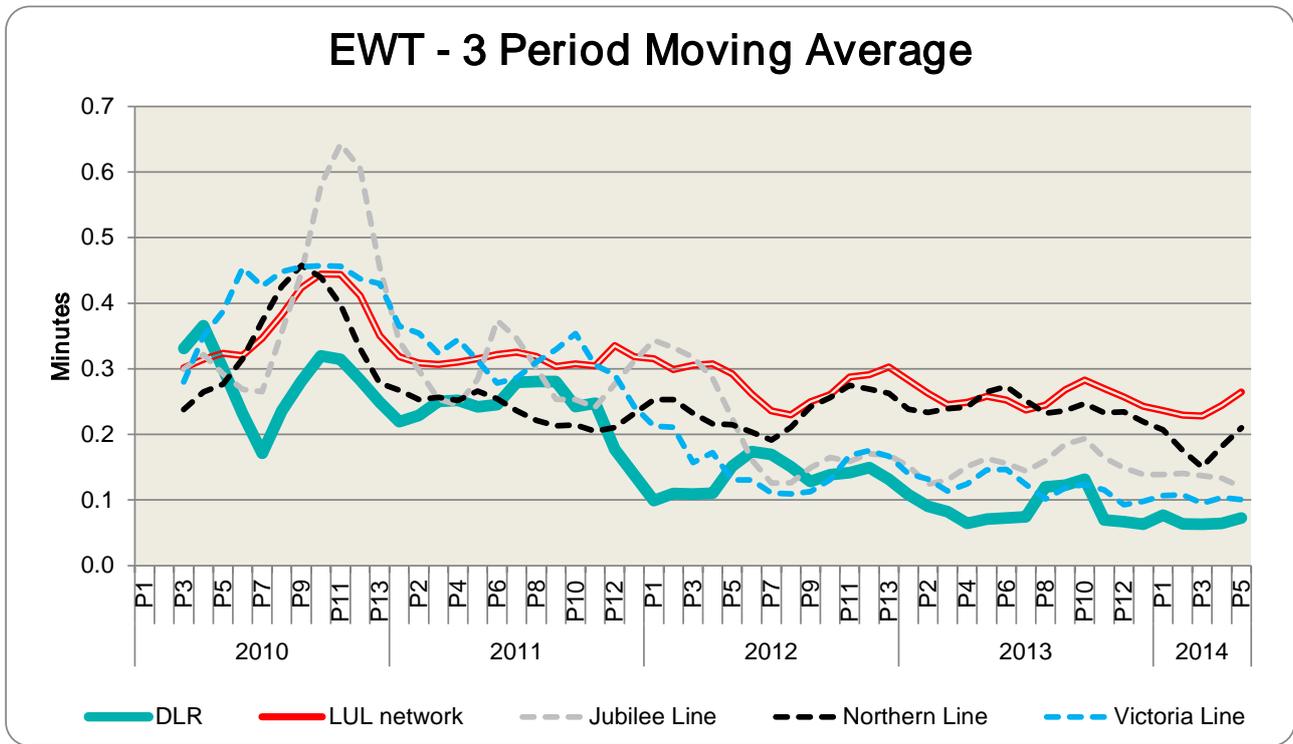


Figure 1 – Excess Waiting Time – DLR and recently upgraded LU Lines (rolling three month average)

4.3 CoMET/Nova measure reliability as the mean distance between failures causing a delay of five minutes or more. DLR does not routinely collate data on this basis and therefore is required to translate its performance data in order to comply with the CoMET/Nova definitions. 2013/14 was the first year that DLR provided this data. Since then, the translation method has been reviewed with Imperial College. In addition, DLR's network-type and service structure can cause unfavourable comparisons to other railways using the CoMET reliability metric.

4.4 TfL believes that it already has a good understanding of the performance of both DLR and LU.

Tube Capital Programme – Infrastructure (section 3.4a to 3.4c)

4.5 The cost of delivering infrastructure projects on the Tube is reducing, in some cases significantly. By 2013/14, the average unit costs of track drainage renewal have reduced by 24 per cent compared to a baseline average for the years 2008/09 – 10/11. The equivalent reductions for other areas are: deep tube track reconditioning 46 per cent; power sub-station upgrades 56 per cent; and earth structures 48 per cent.

4.6 By 2013/14, LU had reduced the average unit costs of delivering Ballasted Track Renewals (BTR) by 23 per cent compared to the baseline years. During this period, BTR output trebled in 2013/14 (23,865 metres) compared to 2012/13 (8,176 metres) and the programme continues at this level in 2014/15. Similarly, renewal of points has increased from 16 in 2012/13 to 25 in 2013/14 and 35 units are planned for

2014/15. At the same time, delivery is in a much more coherent and less disruptive way to the customer, with campaigns of closures. Today, a smaller closure is taken to do it than would typically have been the case to deliver the same job two or three years ago. Record weekend delivery has also been achieved. On more than one occasion, more than 1,000m of BTR plus drainage has been delivered in a single weekend. Overnight BTRs are now also successfully piloting.

4.7 However, as the IIPAG points out, the average unit cost for 2012/13 was higher than forecast. In 2012/13 LU reduced its planned meterage over five jobs; one of these was lost to strike action and four were JNP jobs that were cancelled and re-planned to ensure the risk of engineering overruns was eliminated. That brought the meterage down by about 1700 metres and is the reason for the apparent 15 per cent cost increase. Following that LU brought the track programme together and carried on.

4.8 Other points for noting include:

- (a) the total Track Programme authority for 2011/12 – 2015/16 was set at £549.5m for BCV/SSL. As of Quarter 3 2013/14 (and Period 12 2013/14) the programme was on target to achieve authorised scope (and more) for this authorised cost;
- (b) the way in which work is being carried out is changing. Overnight re-ballasting and full BTR renewal techniques have been developed. The unit rate, although higher than traditional weekend renewals, is affordable within the current authority and is contributing to a business cost reduction (achieved through increased revenue at the weekend, running down the requirement for rail replacement buses, etc.);
- (c) there are enabling costs associated with this: £1.5m per annum is being spent on Road Rail Access Points; new mechanisation (Track Renewal Trains, Flash Butt Welding) has been introduced to make this type of renewal more affordable in future;
- (d) the Access Transformation Programme is central to expanding the working windows available to carry out this work;
- (e) as expected, the benefit of major closures continues to improve the aggregate unit rate position. 6km at Uxbridge in 2014/2015 has been delivered for approximately £1,500/m (one third less than the average unit cost); and
- (f) the decision to expand the strategic programme planning horizon is paying dividends, giving the project teams more time to ensure maximum delivery for least cost.

4.9 As a further means of achieving improvements, TfL is an active member, and currently chair, of the Infrastructure Benchmarking Group (IBG). The IBG was formed under the auspices of Infrastructure UK¹, to contribute to the development of processes, procedures and methodologies for the more efficient delivery and operation of economic infrastructure. To achieve the purpose, members identify,

¹ Infrastructure UK is a unit within the Treasury that works on the UK's long-term infrastructure priorities and secures private sector investment.

share and promote best practice, share knowledge and experience and carry out benchmarking studies to enable individual members to benchmark their costs and practices against other members.

- 4.10 Membership of the IBG is open to all public and private entities whose principal activity is the provision of public infrastructure in the UK and currently comprises the Environment Agency, the Highways Agency, Network Rail and TfL, who signed a Benchmarking and Confidentiality Agreement in autumn 2013. The Group believes that greater improvement can be achieved by working together than could be achieved by working individually.
- 4.11 The Group's work programme has covered approaches to achieving efficiencies, asset management, remote condition monitoring, asset information management and systems, and approaches to cost benchmarking, with further work planned on cost benchmarking, project delivery and key performance indicators. A major target over the next year is to develop a common dashboard of project delivery metrics covering delivery, safety, quality, value and environment. This will enable identification of gaps between member performance and guide future joint improvement activity.
- 4.12 TfL would like to discuss further with the IIPAG its recommendation that Repeatable Works Items (RWIs) are monitored in each Annual Investment Assurance Review. While this has some appeal, TfL is concerned that this would not provide sufficient coverage as not all capital expenditure is subject to these reviews.

Tube Capital Programme – Station Capacity and Station Upgrade Programmes (section 3.4d to 3.4g)

- 4.13 Unit cost benchmarking for the stations capital programmes has improved very significantly on last year, with 63 per cent of the capital investment between 2013/14 – 2015/16 now subject of benchmarking.
- 4.14 For the **Station Capacity Programme** there is a greater level of cost comparison data available. Costs are now comparable at elemental level for 18 elements (compared to just eight elements used in last year's report) and there is a greater breakdown of the cost data. The 18 elements cover 68 per cent of the Estimated Final Cost (EFC) for works at Bond Street, Tottenham Court Road, Bank, Victoria and Vauxhall stations.
- 4.15 Using the unit rate measure of cost per peak time passenger, the LU station capacity projects each have lower unit rates than the averages of both UK and international comparators.
- 4.16 A benchmarking study has been undertaken over the last year for comparing unit rates for the **Stations Stabilisation Programme (SSP)**. 51 RWIs have been identified which are expected to best reflect the scope of works delivered under SSP. This extends the available comparator data from just 10 RWIs used last year. The benchmarking study provided external comparator data for 19 of the 51 RWI's, with these 19 RWIs accounting for 24 per cent of the value of the SSP work packages tendered to date. External comparators were sourced from other railways and shopping malls. Comparators were classified as either Complex i.e. those with more difficult access to site and restricted time on site or Normal.
- 4.17 TfL does not recognise the IIPAG's conclusion that "the costs of many RWIs

delivered by LU appear significantly higher, in some cases more than double, than those delivered elsewhere”². This conclusion does not reflect the impact of site complexity on unit costs. The detailed data presented to the IIPAG shows that:

- (a) weighted average unit rates for LU’s works at complex work sites is lower than comparators for four of the eight RWIs with comparable data; and
- (b) despite the constraints associated with delivering works on complex sites, for five of the 19 RWIs LU has a lower unit rate weighted average than at least one of the comparator organisations delivering works on simpler work site sites, i.e. those work sites with easier access to site and without restricted time on site.

4.18 The range of comparators available is still very small. The work completed so far provides an indication of the range of different costs, but is in no way definitive. The majority of the 19 organisations invited to participate in this study were unable to do so, as they do not have visibility, or capture cost data, at the detailed unit rate level required by LU. LU believes that, by having access to this level of cost data, it is better informed than many organisations with respect to project costs, and therefore in a better position for cost management purposes.

4.19 As the IIPAG point out, LU is already benefitting from direct engagement with Tier 3 and Tier 4 contractors through the STAKE procurement approach. TfL will monitor benefits and unit costs so that any lessons can be applied elsewhere.

4.20 Delivering projects in an operational rail environment is a significant cost factor, affected by the ease of access to site, availability of storage facilities and the impact of working around operational requirements.

4.21 To date the unit costs for LU SSP relate to works being delivered predominantly during engineering hours. This leads to increased costs for site set-up given the relatively short window available to undertake works between operational traffic hours. In addition access to many of the work areas is more difficult given the below ground worksites and central London locations, this gives rise to additional costs for materials and equipment handling and storage.

4.22 Under the **Access Transformation Programme**, LU has been looking for some time at ways to improve productivity. It is now planned to remove platform works from the confines of engineering hours and allow works to take place during the traffic day, subject to a safe system of work being employed. This will significantly expand the working window for all station works going forward. The aim is to be able to introduce this from around January 2015, with the proposal currently being taken through the relevant LU change control processes and consultative machinery.

Tube Maintenance Costs and Reliability (section 3.5)

4.23 While the IIPAG’s observation is correct that the reliability of the Northern line fleet declined in 2013/14, as a result of the introduction of new on-board signalling equipment, this has been temporary. In the current year, there have been on

² IIPAG report section 3.4 (f)

average 50 per cent fewer train-borne signalling incidents per period.

- 4.24 The IIPAG's comments on signalling reliability and maintenance costs relate to information prepared in Quarter 3 of 2013/14. As part of the 2014/15 Asset Management Plan, reviews are already underway that may result in improved unit costs. Also, the signalling asset area covers more than train control and therefore includes a significant number of assets which are being modernised by Programmes other than major upgrades (and hence on different timescales). This has an impact on both cost and performance which will depend upon the specific contribution that each of these asset types make to the overall cost and performance forecasts. Furthermore, the high levels of Lost Customer Hours penalties on the Jubilee line require higher incident response resources, so increasing unit costs.
- 4.25 The Northern line is the most recently upgraded line. The upgrade was achieved with significantly reduced disruption compared to the Jubilee line upgrade. The post upgrade performance of the Northern line is being tracked as a baseline for reliability on the Sub Surface Railway (SSR) signalling upgrade. Reliability improvements implemented post upgrade on the Northern line including remote condition monitoring of axle counters will be incorporated into the new SSR Automatic Train Control (ATC) system. Inductive loops, a source of single point failures on the Northern line, will not be used on the SSL. Instead a radio based system providing overlay coverage will be implemented thus eliminating the single point failures associated with loops. The new ATC system is also intended to have less zonal control thus reducing the volume of wayside equipment and associated maintenance costs further. These factors and detailed analysis of Jubilee and Northern line performances pre and post upgrade will be considered to determine a revised performance forecast for the SSL.
- 4.26 The IIPAG is not correct in its assumption that "potential improvements in whole life cost and performance may be achieved by removing secondary train detection via axle counters and removing inductive loops". LU is not exploring options to remove inductive loops and axle counters. LU is committed to improving Transmission Based Train Control software and installing remote condition monitoring which will help to improve reliability.

Progress in the last 12 months (section 4)

- 4.27 TfL has an extensive programme of delivery improvement and cost reduction initiatives across its business. Only some of these are highlighted by the IIPAG and most of those pre-date the IIPAG's report. TfL welcomes the IIPAG's confirmation that TfL has identified and is working on areas that will bring greatest benefit to London.
- 4.28 Benchmarking is helping to demonstrate the delivery of these benefits and is informing efficient plans for the future. Progress improvement initiatives are monitored by the relevant Operating or Programme Board.

List of appendices to this paper:

Appendix 1: IIPAG Annual Benchmarking Report 2013/14

List of background papers:

None

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IIPAG Annual Benchmarking Report 2013/14

1 EXECUTIVE SUMMARY

- 1.1 This is the Independent Investment Programme Advisory Group's (IIPAG's) second Annual Benchmarking Report, which highlights areas where benchmarking shows that improvements can be made in London. Around two thirds of TfL's expenditure is benchmarked under direction from IIPAG.
- 1.2 This year's benchmarking shows that:
- Tube reliability improved by 32% in 2012, the most recent year that international comparisons are available, and the Tube is now among the most reliable in Europe and North America;
 - Total maintenance costs continue to reduce. Rolling stock costs and reliability are good compared to international comparators, signalling costs and reliability are worse than average and track maintenance costs remain high;
 - Unit costs of delivering many areas infrastructure investment, for example track drainage, earth structures and deep tube renewals, continue to reduce relative to historic baselines; and
 - Costs for Repeatable Work Items (RWIs) for stations works have been compared with external organisations for the first time. Costs of many RWIs delivered by London Underground appear significantly higher than those delivered elsewhere, and this high cost appears to be due to the complexity of access and to much of the work being undertaken in overnight engineering hours.
- 1.3 In addition, reliability on the Docklands Light Railway (DLR) has been compared with international comparators for the first time. The reliability of the DLR, on the measure used internationally, appears worse than the Tube, though this conclusion should be treated with caution given the immaturity of the supporting data and the differences between the networks.
- 1.4 TfL has made good progress in acting on most of the recommendations that IIPAG made in its previous report. In particular, while staff caused delays remain unacceptably high they have reduced by more than a third. New track plant, which should reduce track renewals costs, is being procured and London Underground is pioneering overnight track renewals to reduce its reliance on weekend closures. However, the delivery of the Automated Track Monitoring System (ATMS), which will help reduce maintenance costs and improve safety, has been delayed by eight months in the last year.
- 1.5 IIPAG has made four new recommendations for further improvements to the business:
- To report the costs of delivering RWIs consistently and regularly throughout the business;
 - To ensure that, where practicable, planned extended working hours become the norm for stations works;
 - To ensure that knowledge of differences in the reliability and maintenance costs of recently completed signalling upgrades is incorporated into the whole life costs models for the Subsurface signalling upgrade; and
 - To investigate the apparent difference in reliability between the Tube and DLR and to share best practices.

- 1.6 IIPAG has reiterated its previous recommendations on staff delays, track renewal unit rates and track maintenance unit rates and has also highlighted two areas where the business should be commended: rolling stock unit costs and reliability that are in line with the best delivered internationally and the development of a Cost Estimating Book that should enable the business to improve the value delivered by its infrastructure renewals.
- 1.7 In IIPAG's view it is notable, and commendable, how benchmarking has become part of "business as usual" within much of TfL. The use of good practice benchmarking to identify better approaches and ways of working appears firmly embedded across much of the business and IIPAG is keen to support the further development of this maturity across TfL.

2 BACKGROUND

- 2.1 The Independent Investment Programme Advisory Group was formed in May 2010 and in November 2010 its remit was expanded to include the direction of a team undertaking benchmarking across TfL in November 2010. IIPAG's last report on benchmarking was included as an Appendix to IIPAG's 2012/13 Annual report, dated August 2013. This benchmarking appendix focussed on five recommendations of areas for the business to prioritise to improve reliability or reduce costs and four areas where improvements should be made in the comparisons or application of benchmarking.
- 2.2 61% of TfL's spending is benchmarked and coordinated via a Benchmarking Steering Group (BSG), chaired by IIPAG. This proportion¹ is broadly unchanged in the last 12 months. The breakdown of TfL's spending that is now benchmarked via the BSG is depicted in Figure 1, below.

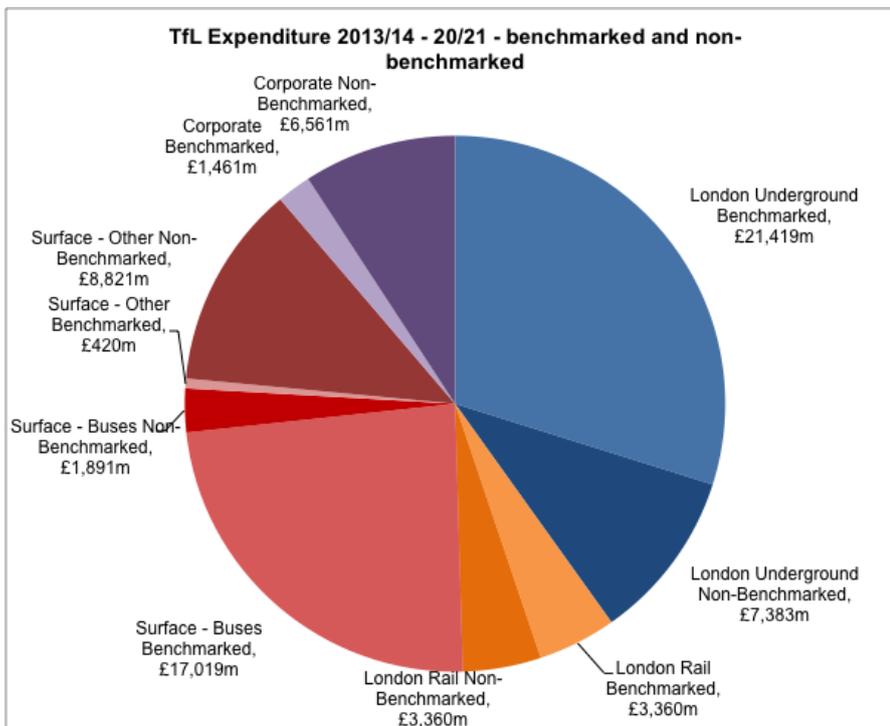


Figure 1: Benchmarking of spending across TfL

- 2.3 TfL has used benchmarking in a number of ways in the past 12 months to drive

¹ 63% of the spend from 2012/13 to 2014/15 was identified as benchmarked in last year's report. The 61% stated above relates to 2013/14 to 2020/21

business improvement and to support decision-making. For example:

- a) Procurement of rolling stock and signalling, including estimating costs of the Subsurface ATC signalling re-tender;
- b) Development of proposals for New Tube for London;
- c) Use of unit costs to support early-stage estimates for renewals projects (Cost Estimating Book);
- d) Detailed international benchmarking of track and signalling maintenance costs, providing assurance for the level of LU's efficiency plans; and
- e) Best practice review of remote condition monitoring, to inform the strategy for implementing predictive and preventative maintenance practices.

- 2.4 This report is provided for the TfL Board and TfL's stakeholders. Following positive feedback from stakeholders regarding the 2012/13 benchmarking report the focus on steps that can be made by the business to further improve reliability and reduce whole life costs has been maintained.
- 2.5 This report draws on benchmarking work undertaken by TfL in the last twelve months, together with discussions and evidence of the Asset Management approaches applied across TfL and IIPAG's experience of costs and delivery at Gate Review. The report describes the key findings from benchmarking that have informed IIPAG's opinion. This report does not comment upon all benchmarking undertaken in the last twelve months but focuses on area where new work has been undertaken or where ongoing work has highlighted issues that are particularly relevant to TfL's Investment Programme.
- 2.6 Section 3 of the report describes IIPAG's view of the main benchmarking findings in: Rail and Underground Reliability; Tube capital programme costs; Tube maintenance unit costs; Tube safety; Bus costs & performance and Surface costs. IIPAG has selected a few areas where it believes TfL should prioritise action to improve.
- 2.7 Section 4 describes progress that has been made in the last year, both in addressing the areas for business improvement that were highlighted by IIPAG in its 2012/13 report and in developing benchmarking across the business.
- 2.8 Section 5 summarises IIPAG's recommendations to the business and Section 6 describes the proposed focus of benchmarking in the next 12 months.

3 KEY FINDINGS FROM BENCHMARKING THIS YEAR

- 3.1 Benchmarking is increasingly used by TfL to inform its asset management plans, its business plans and as a "business as usual" part of its process to improve value for money. While it is often difficult to make like for like comparisons IIPAG has attempted to identify areas where improvements can be made.
- 3.2 Comments and recommendations set out by IIPAG in this report fall in one of three categories:
 - a) Recommendations that arise following benchmarking work that has been undertaken in the last year, especially where new benchmarking has been undertaken following recommendations from IIPAG;
 - b) Recommendations where benchmarking findings should be highlighted when considered alongside other work in TfL's Investment Programme; and
 - c) Comments or recommendations regarding costs, reliability and safety compared to public transport systems elsewhere in Europe and the world.

3.3 Rail & Underground Overall Reliability

- a) The reliability of the Tube network in 2012/13, the most recent year that international comparisons are available, shows a very substantial improvement. London Underground's reliability¹ improved by 32% on the previous year, which itself was 11% better than in 2011/12. The reliability of the Tube network in London is now among the best in Europe and North America, though one of its "peer" metros still has much better reliability, derived from a more automated network.
- b) The Docklands Light Railway reliability is now included in the international comparisons and this also shows large improvement between 2011 and 2012. Reliability, based on the CoMET definition, is worse than LU. This data, being new to these comparisons, should be treated with caution since it typically takes a number of years for good comparisons to be made and structural factors to be better understood. IIPAG considers that, while there are many differences between the DLR and the Tube, there would be benefit in undertaking analysis at system or component level to understand differences in reliability. For example, the DLR has a similar signalling system to that employed on the Jubilee and Northern Lines and comparison of the Mean Time Between Failure (MTBF) of signalling might therefore be beneficial.

IIPAG recommends that the apparent difference in reliability between London Underground and the DLR should be investigated in more detail, for example the MTBF of the signalling system and the structural factors that drive apparent differences should be examined. Best practices should be identified and be shared by April 2015.

3.4 Tube Capital Programme Costs

- a) The unit costs of delivering infrastructure projects on the Tube have reduced, in some cases significantly. In 2013/14 the average costs of track drainage renewal have reduced by 24% compared to the historic unit cost Baseline used by the business². The equivalent reductions for other areas are: deep tube track reconditioning 46%; power sub-station upgrades 56%; earth structures 48%.
- b) IIPAG has previously commented upon and made recommendations on the costs of track renewal and maintenance, particularly for Ballasted Track Renewals (BTRs). The costs of delivering BTRs in 2012/13 increased by 15% when compared with earlier years, compared to a 13% reduction that had been forecast. While most BTRs were delivered in line with forecast costs, in some cases shorter lengths of track were renewed or additional costs were incurred. Overall, less track was renewed, more expensively, than forecast. The presence of asbestos and external impacts, like strike action, were identified causes. There is evidence that the business has learned from this and unit rates for 2013/14, based on values delivered and forecast in December 2013, will be in line with earlier forecasts. This should deliver a 33% reduction from 2012/13, which equates to a 23% reduction from earlier years.
- c) The business has worked hard to improve the quality of data that it has for "Repeatable Work Items" (RWIs), for example the cost of tiling a square metre of floor or stabilising a square metre of embankment. Costs of many RWIs are now

¹ Based on the international CoMET measurement of reliability, the rate of service disruptions longer than five minutes, rather than the customer impact LCH measure used by London Underground

² Average unit costs of works delivered from 2008/09 to 2010/11

captured as “business as usual” with the information being used to estimate future costs, to challenge prices and to improve value for money. This, together with strong engagement with its Tier 3 and 4 contractors for station works known as STAKE, is helping to drive costs down further. Initial analysis of RWIs indicates that this strong engagement is delivering reductions in costs of RWIs that will deliver the 12% savings anticipated in its business plan.

- d) Many of the RWIs relate to ongoing programmes of renewal or refurbishment that are reviewed annually by TfL’s Project Management Office via Independent Assurance Reviews. IIPAG considers that consistent and regular reporting of the RWIs is important and that use of Independent Assurance Reviews for this purpose would be an appropriate approach.

IIPAG commends the use of RWI data to improve value and recommends that costs of delivering RWIs be consistently and regularly reported to the business, for example via Annual Independent Assurance Reviews.

- e) Costs of RWIs for stations have been compared with external comparators for the first time. TfL found that few organisations, particularly in the public sector, consistently and reliably captured costs at the level now recorded in London Underground. However, costs have now been compared with those delivered for overground railways and for UK shopping malls. 24% of the costs of work on the current “Stations Stabilisation Programme” have been compared with external comparators.
- f) Since it is the first time that these comparisons have been made there inevitably remains some uncertainty as to the extent to which costs are truly comparable. However, the costs of many RWIs delivered by London Underground appear significantly higher, in some cases more than double, than those delivered elsewhere.
- g) The relatively high RWI unit rates on London Underground are, at least in part, due to the costs and difficulties involved in delivering work with the minimum of disruption to customers. Almost all work for London Underground is undertaken in engineering hours while many of the comparators have fewer limitations on the time available for works. This limits the productivity of works due to the increased proportion of working time that is required to access the site and set up works and to secure the site ready for customer use before services commence.
- h) London Underground has analysed the unit costs of its delivery and that of its external comparators at a more detailed level to compare unit costs for complex sites, which include those with significantly restricted access, and simpler sites that have fewer limitations. There are very few external comparisons of costs for complex sites, but the external unit costs for complex sites that have been examined appear broadly in line with those delivered on the Tube.
- i) The scale of the differential in costs between complex (i.e. limited access) sites delivered with these constraints in London Underground and those possible at simpler sites elsewhere suggests that significant savings, or increased works, could be delivered were easier access to sites provided with as much unhindered time on site as possible. This would involve stations being closed, or at least part closed, for longer than the current engineering hours. IIPAG understands that TfL aims to introduce works on platforms outside of engineering hours from January 2015, and welcomes this change.

IIPAG recommends that TfL ensure that, where practicable, the planned extended working hours become the norm for station works by January

2015, and that RWI unit rates are carefully tracked to ensure that anticipated changes in unit rates are delivered.

3.5 Tube Maintenance Costs and Reliability

- a) Overall rolling stock maintenance costs are in line with CoMET and Nova metros, and in 2013/14 are generally within or better than the international range of costs used by the PPP Arbiter. Maintenance costs have been in line with forecasts, and these forecasts project materially better unit rates in the future for the Bakerloo, Central, Victoria and Subsurface lines. The largest cause of improvement in the maintenance unit rates is increased train kilometres being run: more is being delivered for a reduced real cost. The spread of unit costs between different lines is now reduced as good practices are spread from high performing lines to those where costs were higher and/or reliability worse.
- b) Rolling Stock reliability is similar to many other metros, but the reliability of new stock on the Victoria and Subsurface lines is forecast to be better than that of peer metros once maintenance and operations are further improved. Reliability growth to date for the new stock on the Victoria and Subsurface lines has been good and gives IIPAG confidence that these forecasts are realistic. Reliability of the Northern line fleet deteriorated in 2013/14 as failures of new train-borne signalling increased the number of service disruptions but IIPAG understands that such failures have now reduced in number.
- c) The business has studied overhaul costs internationally. IIPAG commends this work and would expect that best practice will be identified to feed into rolling stock maintenance regimes.
- d) While rolling stock remains a significant cause of delays and IIPAG understands from its assessment of Asset Management that there remain issues that the business is working to resolve, IIPAG considers that the work that has been completed, together with that forecast, is in line with international best practice.

IIPAG commends TfL for the improvements that it has made in delivering reliable rolling stock at unit costs better than those typically delivered internationally.

- e) The business undertook a significant number of comparisons of signalling costs in 2012/13, agreeing a new interquartile range of international signalling unit costs for lines with modern signalling systems with IIPAG. In 2013/14, signalling maintenance costs on only the Victoria and Piccadilly lines are within this interquartile range. Unit costs on all other lines are in the most expensive quartile with unit costs on the Bakerloo line, which does not have modern signalling, being particularly high.
- f) Unit costs of signalling maintenance per track km for the Jubilee and Northern Lines are currently, and are forecast to remain through to 2020/21, in the worst quartile of this international interquartile range despite signalling on these lines being recently upgraded. In contrast unit costs on the Victoria line are forecast to move to the middle of the inter-quartile range. The business has committed to reviewing the targets for the Northern and Jubilee lines in its next business planning round.
- g) Signalling reliability in 2013/14 is in the third quartile when compared internationally but is improving, albeit from a low base. No material improvements

in reliability, when measured as failures per track km¹, are forecast except for the Victoria and Subsurface lines, where the new system was anticipated to have higher reliability. Forecasts for the subsurface lines will change following the retendering of the Subsurface signalling and it is important that any change in reliability be incorporated into the whole life cost of the signalling system.

- h) Signalling on the Jubilee and Northern Lines is forecast to be the least reliable on the Tube network, despite this reliability excluding the train-borne signalling failures noted above. IIPAG understands that the potential improvements to whole life cost and reliability that may be achieved by removing secondary train detection via axle counters and replacing inductive loops with radio systems in signalling upgrades will be examined and quantified.

IIPAG recommends that, given the very different current and forecast costs and reliability of the signalling on the Victoria Line when compared to the Jubilee and Northern Lines, TfL ensures that it incorporates the knowledge that it has regarding reliability and maintenance costs into its Whole Life Cost models for upgraded signalling for the Subsurface signalling upgrade and finds ways of bringing costs down and reliability up so as to compare more favourably with international benchmarks.

- i) Similarly to signalling, the business undertook a significant number of comparisons of track maintenance costs in 2012/13, agreeing a new interquartile range of international signalling unit costs with IIPAG. Track maintenance costs in 2013/14 remain high, with all lines being in the most expensive quartile.
- j) Track maintenance costs are higher than was anticipated in 2012/13 due to a high number of increased defects being found and corrected. Forecast costs for 2014/15 are higher than previously forecast due to further delays to the Automated Track Monitoring System (ATMS), which in the last year has been delayed a further eight months. IIPAG considers that the continued delay to this system is a significant concern. Track maintenance costs in London are high but, as IIPAG highlighted in its benchmarking report in 2013, a combination of improved track-form and modern monitoring would enable significant improvements in both safety and cost. As a result of these continued delays IIPAG has reduced confidence in the forecast reduction in maintenance unit costs.
- k) IIPAG notes the progress that has been made in to take advantage of the significant investment in track renewal that is currently underway (see Section 4.1). IIPAG considers that the combination of this improved trackform with modern monitoring will be of greatest benefit and so delivering this combination should remain an area of focus.
- l) A different issue is apparent for track maintenance unit costs on the Jubilee, Northern and Piccadilly line grouping. Here, unit costs are forecast to remain higher than other lines, in part due to the costs associated with signalling on the Jubilee and Northern lines.

3.6 Tube Safety

- a) The safety of both staff and customers on the Tube remains good when compared to other metros.

¹ Forecasts for an alternative measure of reliability, Train km between Service Disruption Incidents, show significant improvements as the number of services run increases. IIPAG has continued to use failures/track km for the purposes of this report, since this is the measure that has been used by the business and reported in the past 8 years, but will review the use of the alternate measure.

3.7 Bus costs and performance

- a) Costs and performance remain better than median for all main measures reported previously and top quartile for many. A new measure of customer satisfaction shows improvements in customer satisfaction in 2013¹.
- b) A new measure of vehicle accidents shows London to be worse than median. More detailed examination of the data shows that cities with straight roads, grid layouts and one-way traffic have fewer accidents than cities that have grown organically such as London, which have narrower roads and tight corners.

3.8 Roads Capital Costs

- a) The London Highways Alliance Contracts (LoHAC) were let in April 2013. Initial analysis of unit rates for the main areas of spend under the contract, comprising some 70% of the total budget, indicates that savings range from 12% to 35% when compared to the previous Highway Maintenance Work Contract.

4 PROGRESS IN LAST 12 MONTHS

4.1 Business progress

In its 2013 Annual Benchmarking Report IIPAG identified five priorities for TfL. Progress on these is summarised briefly below:

- a) *TfL closely monitors the results of LU's drive to bring staff-caused Tube delays in line with international norms. Reducing the incidence of delays caused by LU's own staff must be a very high priority and staff caused delays should be reduced to levels consistent with international norms by April 2015*

As can be seen from Figure 2, below, staff performance in 2012/13 improved significantly from the previous year, with 36% fewer LCH attributed to staff issues. This was achieved partly as a result of special measures taken for the Olympic Games. Since then, there has been a small (3%) increase in the number of LCH due to staff. However, there has been an 8% reduction in the number staff related incidents (>5 minutes duration) due to improved Train Operator attendance levels and a greater focus on duty allocation to minimise cancellations.

¹ It is not possible to compare absolute levels of customer satisfaction between cities due to known differences in the responses of different nationalities to such surveys and so trends must be examined.

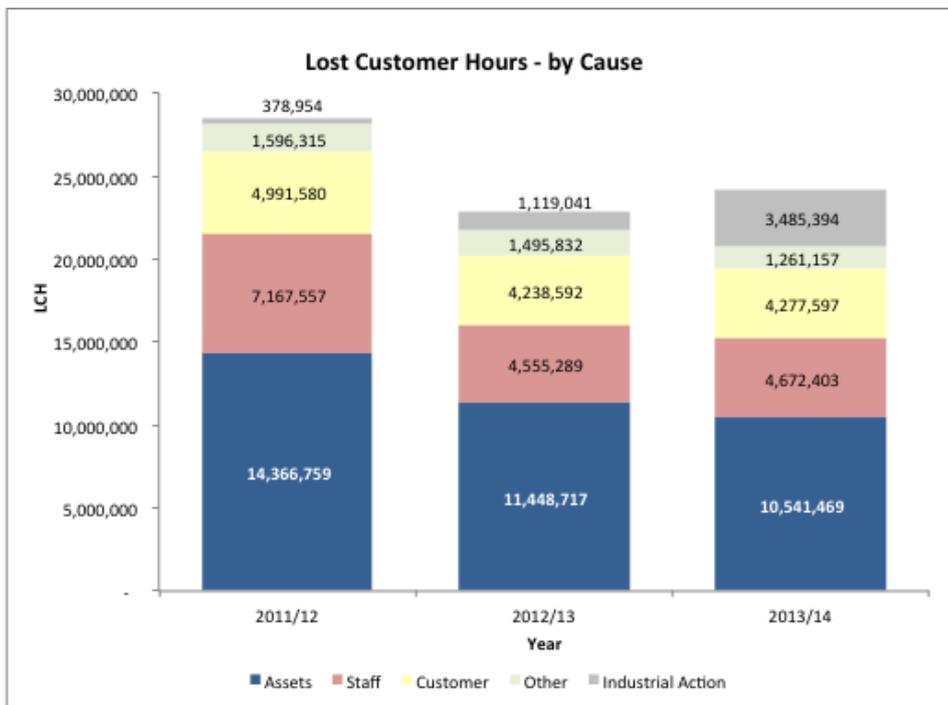


Figure 2: Causes of LCH on London Underground

TfL has implemented a wide range of measures and IIPAG considers that good progress is being made, albeit that the rate of improvement has stalled in 2013/14. International comparisons are now somewhat more favourable, given the step-change in 2012/13, but staff-caused delays remain at an unacceptably high level. IIPAG agrees with the business that it would expect to see further improvements in the number of LCH attributed to staff issues in 2014/15 following the significant enabling works that have been undertaken in the past year.

IIPAG recommends that TfL maintains its focus on delivering the anticipated reductions in train delays caused by staff.

- b) *TfL increases its planned investment in the mechanisation of Tube track renewals, creating radical new methods (for London) based on adapting modern plant, providing more effective access and improving commercial arrangements, with delivery of new plant underway by July 2014, in order to significantly reduce track renewal unit rates from 2015.*

Good progress has been made in this area, with contracts awarded for the first new plant and a suite of renewal approaches being developed to suit different locations and trackforms.

TfL awarded contracts for two new tampers in May 2014, and tenders for the supply of new capacity for lifting and material transport (in particular points and crossings) are currently being assessed with contract award due in the next few months. There is a range of additional items of plant in various stages of consideration and/or development, with a significant number of deliverables due in 2014/15. IIPAG is pleased that the business continues to support this important work but IIPAG is concerned that the original overall strategy and programme for upgrading track plant appears to have been superseded by a number of individual projects.

London Underground is working to deliver improved access via its Access Transformation Programme. Its most recent forecasts include £43m of access related efficiencies over the business plan. Initiatives such as allowing

contractors access to and egress from stations during service hours, such that their time on track can be maximised, and optimising and coordinating access via a single part of the organisation have been delivered. In addition, the business has delivered ten road-rail access points since April 2013 with a further six in progress. A major closure, where 5.9km of track was renewed, was delivered at Uxbridge. This major closure alone reduced capital costs by some £3m.

In contrast to such major closures the business has also pioneered overnight ballasted track renewals (BTRs), where track is renewed in overnight engineering hours rather than by closing track for a weekend. While unit rates are higher than delivering a large renewal over a weekend they are comparable to the cost of delivering the short sections necessary at a large number of locations in London. This approach is unique to London, since no other metro in the world delivers overnight renewals back into service at full line speed. This is essential in London given the intensive service that is run.

London Underground is investigating innovative trackforms via its Track Form Study, which commenced in June 2013. 29 track systems and components have been evaluated and a number of these are being assessed to understand whether they might deliver lower whole life costs in the London Underground environment. A new track construction is now being delivered in the deep tube.

IIPAG recommends that TfL maintains its focus on delivering the anticipated reductions in track renewals rate, and that the innovation programme be given challenging targets and robust programme management.

- c) *TfL focuses on the delivery of its plans to deliver changes to its working practices and increase the automation of maintenance and condition monitoring, taking advantage of its significant investment in track renewals, in order to reduce track maintenance unit rates further than currently planned from 2015.*

Around 20% of the JNP lines are now patrolled at the 7 day interval possible where flat bottom continuously welded rail has been installed and the move to this regime is being introduced on BCV and SSL lines. This, together with the increased amount of flat bottomed rail on the network following renewals, is forecast to reduce maintenance costs by £25.6m / annum by 2021.

While progress is being made in this area IIPAG remains concerned that the delay to ATMS will affect the rapid delivery of cost reductions.

IIPAG recommends that TfL maintains its focus on delivering the anticipated reductions in track maintenance unit rates.

- d) *The current approach to delivering bus services is maintained, including the engagement with the International Bus Benchmarking Group, which should be kept under review for use elsewhere.*

TfL has continued its involvement with the International Bus Benchmarking Group and has continued to deliver bus services as it has for some years.

- e) *TfL finalises its technology strategy for signalling and telecommunications in 2013, clearly setting out the strategic direction and taking into account the implications of further proliferation of systems on whole life costs including for example, its maintenance practices, depots, driver training and maintenance and renewals plant.*

TfL has made progress on signalling strategy through the development of tactical plans for the sub-surface signalling upgrade and for the signalling upgrade associated with New Tube for London. However, more remains to be done to

produce an overall technical strategy. Little progress appears to have been made with telecommunications strategy. A fragmented approach remains, which continues to drive significant unnecessary cost.

4.2 Benchmarking Progress

In its 2013 Annual Benchmarking Report IIPAG identified seven benchmarking priorities for TfL. Progress on these is summarised briefly below:

- a) *TfL develops more and better external comparators for its Tube capital programme by July 2014*

London Underground has found it difficult to identify comparable organisations that capture cost data at suitably detailed level, but has compared costs of a number of Repeatable Work Items (RWIs) that comprise 24% of the costs of its Stations Stabilisation Programme with Network Rail, a train operating company, a metro and a shopping centre. The costs of delivering track renewals for specific sites have been compared within London Underground and best practices in track renewals at other metros have been studied.

- b) *TfL continues to develop benchmarking on the Deep Tube Upgrade¹ to a point where it can be used to demonstrate the value for money of decisions made for all the main items of expenditure*

The NTfL programme has its own benchmarking strategy, overseen by its programme board, to ensure that benchmarking information is available to make decisions in the programme. In the last year the main areas studied have been signalling procurement, which is being used to inform the Subsurface ATC retendering, and Unattended Train Operation, which has been investigated via the CoMET group. There have also been a number of bilateral engagements with other metros to address specific issues such as Platform Edge Doors.

- c) *Further, more detailed, benchmarking of the Stations Capital Programme, involving more external comparison, be undertaken by July 2014*

London Underground now captures the unit costs for 51 RWIs covering 37% of the value of the Station Stabilisation Programme. 19 of these, 24% of tendered packages to date, have been compared with external comparators. London Underground now has a comprehensive Estimating Book to assist its commercial managers to understand and challenge costs. As noted in 3.4c) this has required significant effort and puts London Underground in a strong position to improve the value of its delivery.

- d) *By August 2013 TfL's project assurance process should include a requirement to use benchmarking at appropriate stages, in order to better inform decision makers in the evaluation of proposed investments*

TfL's Pathway project assurance process now includes a requirement for External Experts to challenge projects for benchmarking evidence of the value for money of their projects.

- e) *TfL understand and monitor costs and performance under the London Highways Alliance Contracts (LoHAC), which were let in April 2013 to become the approach to delivering much of the road renewals and maintenance in London*

As noted in section 3.8, costs under the LoHAC contracts appear to be broadly in line with the business case. IIPAG considers that further, more detailed, work in

¹ Now known as New Tube for London (NTfL)

this area would be helpful in the next year and would expect this to be part of Surface Transport's benchmarking plan.

- f) *TfL to investigate what comparisons can be made across Rail and Underground other than for the Tube London*

The signalling procurement study for the New Tube for London involved discussions with London Overground, Crossrail and Surface Transport and, as noted in section 3.3, the DLR is now a member of the Nova metro group and so is included in international comparisons.

- g) *TfL investigate what benchmarking of road structures can be undertaken*

Bridge renewal costs have been compared between Surface Transport and Rail & Underground. The limited size of the sample and significant difference in the types of bridges meant detailed comparison of costs was not possible although comparison of the overall "cost stack" was undertaken.

4.3 IIPAG view of progress

- a) In IIPAG's view it is notable, and commendable, how benchmarking has become part of "business as usual" within much of TfL. The use of good practice benchmarking to identify better approaches and ways of working appears firmly embedded and many parts of the business (for example New Tube for London, Surface Transport Asset Management Directorate) have developed their own strategies for benchmarking to ensure that they have appropriate information to improve value. In developing and delivering these strategies the business draws upon expertise in its benchmarking team.
- b) In most cases TfL has made good overall progress in delivering the actions recommended by IIPAG in last year's report. IIPAG has reiterated its recommendations for staff delays, track renewal costs and track maintenance costs, where it believes that they remain particularly important.

5 KEY RECOMMENDATIONS

- 5.1 IIPAG has made four new recommendations to TfL of areas to prioritise. IIPAG recommends that:

- 1. The apparent difference in reliability between London Underground and the DLR should be investigated in more detail, for example the MTBF of the signalling system and the structural factors that drive apparent differences should be examined. Best practices should be identified and be shared by April 2015.***
- 2. Costs of delivering RWIs be consistently and regularly reported to the business, for example via Annual Independent Assurance Reviews.***
- 3. TfL ensure that, where practicable, the planned extended working hours become the norm for station works by January 2015, and that RWI unit rates are carefully tracked to ensure that anticipated changes in unit rates are delivered.***
- 4. Given the very different current and forecast costs and reliability of the signalling on the Victoria Line when compared to the Jubilee and Northern Lines, TfL ensures that it incorporates the knowledge that it has regarding reliability and maintenance costs into its Whole Life Cost models for upgraded signalling for the Subsurface signalling upgrade and finds ways of***

bringing costs down and reliability up so as to compare more favourably with international benchmarks.

5.2 In addition IIPAG has reiterated three of its previous recommendations where it believes that they remain particularly important. IIPAG recommends that:

- 5. IIPAG recommends that TfL maintains its focus on delivering the anticipated reductions in train delays caused by staff.***
- 6. TfL maintains its focus on delivering the anticipated reductions in track renewals rates, and that the innovation programme be given challenging targets and robust programme management.***
- 7. TfL maintains its focus on delivering the anticipated reductions in track maintenance unit rates.***

6 FUTURE BENCHMARKING WORK

6.1 The development of benchmarking strategies, and associated programmes of work, across TfL ensures that benchmarking work is aligned with the needs of the business and is properly coordinated. While these have been developed for many areas of the business IIPAG considers that their coverage should be expanded such that there is a clear and consistent set of benchmarking objectives, strategies, plans and deliverables, across TfL.

6.2 IIPAG recommends that:

- 8. TfL develop benchmarking strategies and sets out consistent plans and deliverables for benchmarking for each material part of its business. In particular:***
 - a) Refresh existing strategies for New Tube for London and London Underground Infrastructure renewal;***
 - b) Deliver recently developed strategies for London Underground Operations and Surface Asset Management; and***
 - c) Agree and implement benchmarking strategies for London Rail and London Underground's Stations Capital Programme.***

Paul Jenkins & Mike Woods, IIPAG September 2014