

Date: 27 July 2016

Item: **Independent Investment Programme Advisory Group –
Annual Report 2015/16**

This paper will be considered in public

1 Summary

- 1.1 This paper attaches the Independent Investment Programme Advisory Group (IIPAG) Annual Report for 2015/16 and the TfL management response (Appendix 1).

2 Recommendation

- 2.1 **The Committee is asked to note the Independent Investment Programme Advisory Group's Annual Report for 2015/16 and to endorse TfL's management response, for approval by the Mayor.**

3 Background

- 3.1 The IIPAG Terms of Reference, established in 2010, require the production of three annual documents. The Annual Work Plan and Budget are provided in a separate paper to the Committee. This paper provides the third document, the IIPAG Annual Report for 2015/16, which reports on TfL's delivery of its Investment Programme for the period from April 2015 to March 2016. IIPAG submitted its Annual Report to TfL on 3 June 2016.
- 3.2 The IIPAG's Terms of Reference also include the direction of benchmarking across TfL. The Annual Benchmarking Report is included as an appendix to the Annual Report.

4 Commentary

- 4.1 TfL make a number of observations and comments on the content of the IIPAG Annual Report, which are inserted into the corresponding sections of the Report attached at Appendix 1.

List of appendices to this paper:

Appendix 1: IIPAG Annual Report 2015/16, including the Annual Benchmarking Report, with incorporated TfL Management Response.

List of background papers: None

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TRANSPORT for LONDON

**INDEPENDENT INVESTMENT PROGRAMME
ADVISORY GROUP
(IIPAG)**

Annual Report 2015 – 2016

May 2016

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EXECUTIVE SUMMARY

This is the sixth Annual Report delivered by the Independent Investment Programme Advisory Group (IIPAG), which was first set up in May 2010. This report is based on almost six years of experience and scrutiny of TfL's Investment Programme. In this time IIPAG has participated in more than 250 project reviews, primarily for projects that have a capital value of over £50m with a handful of the largest and most complex programmes forecast to cost many billions of pounds.

IIPAG has participated in the review of over 50 projects in the past year. Compared to previous years IIPAG has increased the amount of attention that it gives to major projects, typically those with a forecast cost of over £1bn where complexity or risks associated with the projects are often larger, and it has also continued its review of areas of particular systemic importance to the delivery of this large and complex capital programme.

In the past year there has been no reduction in the proportion of IIPAG's recommendations relating to interfaces with external parties, such as Network Rail, commercial and contract issues (particularly with external developers) and proper and transparent governance. However, as noted in its previous Annual Report, delivery phases of projects are now generally well managed and IIPAG has made relatively few recommendations for projects to improve project or risk management during delivery.

In IIPAG's view TfL's governance could be improved by improving the effectiveness of TfL's project and programme boards, which govern all TfL's projects. IIPAG has noted a number of issues that could and should have been effectively addressed by more effective boards on a range of projects in both Rail & Underground and Surface Transport. Shortcomings in programme boards result in insufficiently clear direction and constructive challenge, insufficient resources and, in some cases, permitting changes in scope without considering additional funding.

IIPAG has noted steady progress on commercial and procurement processes and capability, and considers that project teams are now more focused upon commercial issues than they have previously been and are more willing to seek solutions within available funding rather than instinctively seeking extra funding. Further progress is required in this area.

Once again, IIPAG has noted that few projects are formally closed via TfL's processes. IIPAG has noted and commented upon this consistently over its six years of experience but project closures remain around half the number that IIPAG would anticipate. Project closure is an essential stage of an effective project management lifecycle: it should enable lessons to be learned and the benefits of the project to be assessed, both of which are vital to an organisation learning, improving and delivering better value.

IIPAG has continued its closer involvement with the Four Lines Modernisation Automatic control (4LM ATC, previously known as the Subsurface Upgrade Automatic Train Control) programme. The 4LM ATC is one of the most complex re-signalling projects ever undertaken on a Metro railway, and unavoidably includes some novel and unique features. IIPAG has raised a number of concerns in relation to Thales progress, Thales subcontracting, the train fit-out work by Bombardier, and interfaces with Network Rail. The new team has got off to a good start, but it is a difficult programme and continues to represent a material risk to London

Underground. It is of fundamental importance that London Underground's senior management team continues to support this programme as a high priority, by providing access to the railway and rolling stock, timely agreement of detailed requirements, suitable human resources and new operational processes, in order that it can be delivered in accordance with its budget and schedule.

Late in the first quarter of 2015 it became apparent that the Northern Line Extension project was suffering severe delay with associated significant cost implications. IIPAG instigated an Interim review, which was held in April 2015, and issued a report making recommendations which fell into two categories: firstly, the immediate action required to establish an appropriately resourced project management team; and, secondly, that a review should be undertaken of whether any lessons could be learned for future schemes.

Over the last twelve months IIPAG have received further briefings from the project team and in turn have briefed TfL senior Directors. The theme of IIPAG's recommendations has remained. The NLE project remains of high concern to IIPAG and IIPAG will continue to seek regular briefings from the Sponsor, Project Director and the project delivery team.

IIPAG has continued to monitor developments with New Tube for London (NTfL), and there have been some positive developments in the last year relating to the rolling stock specification. However, IIPAG has a number of concerns about the signalling procurement which is running much later than it ideally would be, contains a far more ambitious scope than is necessary and does not appear to be set up to get best value from the very limited pool of signalling suppliers.

TfL has now begun serious efforts to improve its Information and Telecoms organisation and arrangements. Significant improvements to the leadership of telecommunications and IM have been made and considerable senior management energy is now being applied. The recommendations that IIPAG has made for the improvement of telecoms at TfL over the last four years remain highly relevant, in order to save money and improve service. IIPAG will work with the new leadership team to help bring about the radical improvements that TfL now agrees are both necessary and achievable.

IIPAG has reviewed TfL's approach to providing suitable resources, in particular its approach to Non-Permanent Labour (NPL). The levels of NPL understandably vary greatly across the business, but IIPAG is concerned that there is not an underlying strategy that sets out clearly where and how TfL will provide skilled resources to meet its needs. In essence, TfL does not appear to have decided what type of business it wishes to be. For example, it could provide much or all of its skilled resources from the external market or it could commit to using internal resources wherever possible. Both have advantages and disadvantages, but IIPAG does not believe that the business has sufficient understanding of the total costs of its current staff and so is not in a good position to make a well-informed decision.

IIPAG understands that TfL is currently commencing a reorganisation to deliver better value and to give a clearer distinction between its delivery businesses and its supporting services. This is a great opportunity for TfL to address issues that IIPAG

has raised and to consolidate progress and momentum where progress has been made. IIPAG will work to support the business in these changes.

Overall, benchmarking shows that trends in costs and reliability of TfL's services remain good compared to its international peers, with the unit operating costs and reliability on the Tube now having improved year-on-year for 5 years and London's buses remaining among the best in the world. Revised access arrangements for stations works are delivering significant benefits, reducing the unit costs of some works by almost a half. However, delays caused by staff on the Tube remain among the highest in the world. Whilst there was a large reduction in these delays around the time of the Olympics, and this improvement has been maintained, there has been little progress in reducing them further. London Underground is now in the position that if current trends of improvement in the reliability of equipment, such as trains and signals, continue there will be a larger number of delays caused by staff than by all equipment combined within two years.

In the next year IIPAG will continue to advise TfL on how to improve the delivery of its Investment Programme, in particular continuing its emphasis on TfL's largest projects. In 2015 TfL split project assurance from its Project Management Office, and TfL is now rolling out a risk-based approach to assurance in addition to its traditional gate or event driven assurance. This change should help IIPAG better focus its effort on where risks and issues are arising in TfL's portfolio of projects. IIPAG will also work with the business to build upon recent momentum in the efficient provision of Information and Communication Technologies across the business.

London's success and growth in recent decades is at risk without the expansion of rapid and reliable transport provision across the capital. This has been recognised via the commitment of central government to the development of Crossrail 2 and TfL's development of New Tube for London, which will upgrade many of London's deep tube lines with new signalling and rolling stock. However, the funds available to TfL are being reduced in a way that it has not had to address in recent times and it will need to strive ever harder to do more for less. It remains essential that TfL can demonstrate that it can spend the money entrusted to it wisely and effectively, and IIPAG looks forward to continuing to work with TfL to help it to deliver this objective.

1. INTRODUCTION

1.1. Background

The Mayor of London, Boris Johnson and the then Secretary of State for Transport, Lord Adonis originally established an Investment Programme Advisory Group in May 2010. It was renamed as the Independent Investment Programme Advisory Group (IIPAG) in November 2010, when its remit was increased.

IIPAG's Terms of Reference¹ include maintenance, renewals and line upgrades as well as major projects for both Rail and Surface businesses. They also include the direction of a team undertaking benchmarking across TfL and commentary upon the draft Asset Management Plans of London Underground, but they specifically exclude operational issues and the activities of Crossrail Limited.

IIPAG has comprised six members and an advisor, supported by a personal assistant, for most of 2015/16. Two further members were recruited during the year, both commencing their roles in April 2016, taking IIPAG to its full complement of 8 members. All of these positions are part time and commitments range from 2 to 8 days a month. Projects and systemic issues are typically reviewed by two people, with one individual nominated to lead a topic. IIPAG meets monthly to discuss its findings, identify topics or projects for further study and to set out its reviews for the coming months. It is supported in this by TfL Project Assurance².

This is the sixth Annual Report presented by IIPAG. Earlier reports set out the history of IIPAG's appointment and its terms of Reference in more detail, as well as its progress.

1.2. Purpose and structure of this report

IIPAG's remit requires it to:

- Publish an annual report on TfL's delivery of its Investment Programme from its work during the year;
- Review the level of resource required to undertake the planned future activities; and
- Consult with the Mayor and the Secretary of State for Transport and propose a work plan for the year.

This report addresses the first of these requirements and draws out common themes, systemic issues and lessons learned.

Section 2 of the report describes the Project Reviews undertaken from April 2015 to March 2016. Examples of good practice within TfL are also identified.

Section 3 describes the work that IIPAG's views on a small number of "Major Projects", where Estimated Final costs are typically over or around £1bn.

¹ <http://www.tfl.gov.uk/cdn/static/cms/documents/Item08-4-Nov-2010-Board-IIPAG-Terms-of-Reference.pdf>

² Project Assurance has been separated from TfL's Project Management Office in the last year, with TfL Project Assurance now reporting to TfL's Managing Director Finance, see section 3.3 for further detail

Section 4 outlines the progress that has been made over the last year in addressing systemic issues that were identified across reviews of multiple projects and Section 5 addresses Asset Management and Benchmarking.

1.3. Meetings and Communication with TfL

The schedule of meetings and the arrangements for communication developed since IIPAG's inception is unchanged from previous years. The Chair of IIPAG and the Commissioner meet bi-monthly to discuss and agree topics that IIPAG and the business consider important and IIPAG meets the members of the Commissioner's Leadership Team twice each year to set out progress and to discuss issues. Members of the IIPAG Team attend the monthly Rail and Underground Board and the Surface Transport All Approvals Board meetings when projects that have been reviewed by IIPAG are discussed.

IIPAG continues to attend relevant Boards, Committees and panels within TfL in support of the corporate governance and approvals process for projects where it has reviewed progress. This is typically for projects with an Estimated Final Cost (EFC) in excess of £50m and also for a small number of projects that IIPAG considers important for other reasons, such as novelty or complexity. IIPAG continues to chair the Benchmarking Steering Group.

IIPAG's formal output to the business is in the form of reports related to an Integrated Assurance Review (IAR) instigated by TfL Project Assurance, an Interim Review of projects instigated by IIPAG or a systemic issue. These are submitted to senior panels or Board committees within TfL to ensure that IIPAG's recommendations are considered at an appropriate level. IIPAG's reports set out its recommendations to TfL's Board on specific projects or systemic issues. IIPAG often presents its views to the relevant panel or committee and the Management Response from the business, which outlines TfL's response to IIPAG's recommendations, is also discussed. IIPAG's reports are also forwarded to the Department for Transport (DfT).

2. PROJECT REVIEWS

2.1. Approach

TfL has a system of Integrated Assurance Reviews (IARs) that establish the compliance and status of capital projects across TfL. TfL Project Assurance leads these reviews, taking into account the status of the project with regard to programme, cost, quality and commercial issues, as well as their governance and management.

TfL usually commissions an External Expert (EE) to undertake an independent review, with internal peer review used in some cases. TfL Project Assurance also arranges for IIPAG to be involved with reviews of major programmes and projects with a value greater than £50m, and discusses and agrees other projects where IIPAG wishes to be involved.

Through the review IIPAG aims to identify relevant issues, present constructive challenge and to make recommendations to help the project teams improve their performance. IIPAG will usually meet the EE at least once to suggest emphasis and to discuss findings. TfL Project Assurance chairs the formal Gate Review Meeting, which IIPAG attends, and IIPAG then prepares its own independent report.

Historically, TfL has primarily undertaken these assurance reviews at Gates in the process, in particular when funds are authorised or when contracts are put out to tender or awarded. TfL has started a move toward “Continuous Assurance” in 2015/16, with more frequent checks focussed on projects assessed as being of higher risk, for example due to their size or complexity. Key components of this Continuous Assurance include tracking the recommendations from the IARs and examining the dashboards for signs of emerging issues. If TfL Assurance is concerned regarding a project it can then conduct a Targeted Assurance Review to examine the project in more detail. The roll-out of this Continuous Assurance approach commenced in March 2016.

A list of the Integrated Assurance Reviews in which IIPAG has participated, together with a description of themes apparent in its recommendations, forms section 2.2. Instances of best practice within TfL are also highlighted.

In addition to the Integrated Assurance Reviews, IIPAG has initiated a number of Interim Reviews to ensure that major projects are reviewed at appropriate intervals, typically during delivery of projects but also in other phases as necessary. IIPAG bases its schedule of interim reviews on:

- The time of the last Gate or Interim Review, typically aiming to review all projects at least annually;
- The current phase of activity and associated risks; and
- Known issues that might give rise to a cost increase or delayed delivery.

These Interim Reviews are undertaken by IIPAG alone, they focus on the major projects and they involve the minimum of project resources necessary to enable IIPAG to understand progress and issues. They are broadly based on the Office for Government Commerce approach to project review. The Interim Reviews that IIPAG has undertaken are listed in section 2.3.

In addition to its involvement in the Reviews IIPAG receives quarterly “dashboards” that set out project progress. Progress on this is described in section 2.4.

TfL Response:

Approach: IIPAG’s input to the Integrated Assurance Reviews is central to the assurance process. The new Three Lines of Assurance framework was approved by the Committee in January 2015 and is now established and understood by the sponsor and delivery teams. Over 60 projects and programmes are now under Continuous Assurance, with the Project Assurance team attending Project and Programme Boards, holding regular updates with sponsors and scrutinising project dashboards.

The Continuous Assurance provides a more dynamic understanding than can be gained from a single point-in-time review, which can often be more than a year apart. From October 2016, the Continuous Assurance outputs will be consolidated into a periodic report for the Chief Finance Officer and IIPAG.

Further developments are planned for 2016/17, particularly to monitor the progress made against the recommendations from the Integrated Assurance Reviews, including those from IIPAG.

2.2. Gateway Reviews

During the last year, members of the group have been involved with Integrated Assurance Reviews (IARs) as noted below:

Integrated Assurance Reviews in which IIPAG has participated: April 2015-March 2016	Stage
New Train for Docklands	Initiation
STIP 2 (Work Package 1)	Initiation
Future Ticketing Programme (Phase 4)	Initiation
Croxley Rail Link	Initiation
STIP 2 (Work Package 1) Supplemental Advice	Initiation
Step Free Access	Initiation
ULEZ (Ultra Low Emission Zone)	Initiation & Option
ULEZ (Ultra Low Emission Zone)	Initiation & Option
SITS (Surface Intelligent Transport System)	Option
Transforming Information Management (TIM)	Option
Crossrail 2	Option
A23/A232 Fiveways Project	Option
Northern Line World Class (NLU2) Project	Option
Central London Cycling Grid	Option
Cycle Hire Transformation (UPDATE)	Option+
92 TS AC Traction Conversion	Option & Pre-Tender

Integrated Assurance Reviews in which IIPAG has participated: April 2015-March 2016	Stage
Bank SCU	Design
JNAT (Jubilee& Northern Additional Trains)	Pre-Tender
92TS Data Transmission System Replacement Project	Pre-Tender
92TS Traction Conversion	Pre-Tender
Camden Town Station Capacity Upgrade	Pre-Tender
Finsbury Park (Western Ticket Hall)	Contract Award
Cycle Hire Transformation (Update)	Contract Award Update
PICU (Service Control Centre)	Contract Award
Victoria Line WCC	Contract Award
JLU WCC	Contract Award
Tottenham Court Road	Interim
Silvertown Tunnel Project	Interim
Bond Street Station Upgrade	Interim
Silvertown Interim (DCO Application)	Interim
Overnight BTR (Ballasted Track Replacement)	Interim
Brent Cross Regeneration Project	Interim
Metropolitan Line Extension	Interim
Predictive & Preventative Portfolio	Annual
Overground Extension to Barking Riverside	Annual
Run Better Portfolio	Annual
Bank Bloomberg Place Project	Annual
Quietways	Annual
Barking Riverside Extension	Annual
Cycling Vision Portfolio	Annual
New Tube for London (NTfL)	Annual
Surface Asset Capital Renewals	Annual
92TS Bogie Replacement Project	Close
SSR Power Upgrades	Close
STIP 1 (WP2)	Close

The number of IARs in which IIPAG has participated has remained approximately constant in 2015/16 when compared to 2014/15, and the split between the various stages of the projects also remains similar to the previous year. Just under half of reviews take place at the stages prior to contract award, a similar proportion to 2014/15.

IIPAG has also undertaken a similar number of Interim Reviews (see section 2.3), has continued to maintain its keen interest in the progress of the Subsurface Upgrade Programme Automatic Train Control (now known as the Four Lines Modernisation, 4LM, see section 3.2) and has significantly increased its scrutiny of the Northern Line Extension (see section 3.3). IIPAG has also undertaken reviews of a range of major projects (sections 3.4 to 3.8), including the projects that comprise the Mayor's Cycling Vision.

As noted in many previous IIPAG reports there remain very few projects that have been totally signed off as completed as defined within the TfL Pathway process. The number of projects Closed in 2015/16 rose to three, compared with two in the previous year. On at least one occasion the Close Integrated Assurance Review has been called and then deferred indefinitely. IIPAG would expect that the number of projects Closed in each year would average a similar number to those where there is a Contract Award review. IIPAG typically undertakes six to eight of these in a year and so the current level of Closed projects is less than half the levels that IIPAG would anticipate. As noted last year, in some cases infrastructure has now been in place and in use for over six years without the project achieving Close.

IIPAG continues to believe that this is poor practice and it does not conform with TfL's requirements. As noted previously the lack of sufficient rigour and leadership to Close projects results in:

- no assessment of the benefits delivered compared with those anticipated at the outset, and so the very reasons for creating the projects in the first place are not being proven;
- lessons learned are not generally well disseminated and so knowledge is often retained by individuals;
- individuals taking knowledge with them as they leave the business.

IIPAG has made over 230 recommendations to TfL in the past year. These recommendations have been placed into broad categories to enable IIPAG to understand whether TfL's improvements are affecting the mix of areas where IIPAG makes its recommendations. In previous years IIPAG has reported the proportion of its recommendations in four areas, which typically comprised the great majority its recommendations. These areas were:

- Commercial and Contract, such as key considerations that should be included in an Invitation to Tender or addressing shortcomings in a Procurement Strategy;
- Project Management and Interfaces, where insufficient consideration has been given to the delivery of projects, particularly where there are interfaces with other stakeholders such as Network Rail;
- Requirements and Sponsorship, such as recommendations to better define requirements, to set out a clear business case and to ensure that suitable sponsorship is in place to deliver the business case; and
- Risk, where risks have not been properly identified, quantified or managed.

In IIPAG's last report it noted that there was an increased number of recommendations where IIPAG recommendations addressed proper governance: for example ensuring that proper processes were followed or that an aspect of a project be scrutinised in greater detail at a more senior level. The table below notes the proportion of recommendations that were made in this area, as well as those in the four categories that have been compared in previous reports.

The balance between the areas where IIPAG has made its recommendations is little changed from 2014/15, though it is materially different to the previous year.

Area	Proportion of Recommendations ³		
	2013/14	2014/15	2015/16
Commercial and Contract	25%	25%	25%
Project Management and Interfaces	25%	15%	15%
Requirements and Sponsorship	20%	15%	20%
Risk	20%	5%	5%
Governance	Unavailable	15%	20%
TOTAL	90%	75%	85%

Commercial and Contract issues remain the most common, and IIPAG's view on progress in this area is set out in Section 4.5.

IIPAG has made a similar number of recommendations relating to Project Management and Interfaces to last year and, within this, the number of recommendations that relate to interfaces with external parties (such as a developer or Network Rail) has remained constant. IIPAG remains of the view that increased focus on these relationships would be valuable, delivering savings of both money and time, and recommends that TfL increase its efforts to improve its relationship and mutual understanding of priorities with Network Rail, in particular.

As noted last year, very few of IIPAG's recommendations now directly mention Sponsorship as an issue, and IIPAG's view on progress in sponsorship is set out in Section 4.2. However, the setting of clear project requirements continues to be the focus of many recommendations and it is notable that IIPAG has recommended improvements in the setting and tracking of the benefits of projects in more cases.

In the current, more financially constrained circumstances, there is also greater emphasis in IIPAG's recommendations of value engineering and management to enable projects to meet or better financial and schedule targets.

Risk, in particular its management during a project, is now rarely mentioned in IIPAG's advice. It does, however, continue to be a significant issue in the commercial aspects of projects (such issues are recorded as "Commercial" rather than "Risk" for these purposes). Issues tend to centre around the understanding and application of the contract, for example around changes in scope.

An even larger proportion of IIPAG's recommendations relate to governance than previously. IIPAG has now decided to note this as a systemic issue for TfL and has set out its views in section 4.4.

IIPAG has noted the following examples of best practice in TfL in the past year:

- Future Ticketing Programme: The standard and clarity of documentation provided for Phase 4 of the programme was exemplary;

³ to nearest 5%

- Surface Transport engaged an external consultancy to undertake an in depth “Lesson Learnt” review of the STIP1 programme and have applied the learning to the second phase;
- Surface Transport undertook a cross-asset class prioritisation of its works to ensure that investment was properly prioritised across all assets.

TfL Response:

Gateway Reviews (Project Close-Out): It is recognised that improvement is needed to achieve more consistency in reviewing projects at the closure stage. Although the number of Project Close reviews including IIPAG has not significantly improved, the Project Assurance Team has conducted eight close reviews in 2015/16.

The issues identified by IIPAG – particularly the capture of the benefits and lessons learnt – are understood. The number of Integrated Assurance Reviews carried out at the Second Line of Assurance should not be confused with the Pathway closure gate at the First Line of Assurance, normally approved by the sponsor or project board. The Continuous Assurance activity will also enable greater visibility of projects passing through Pathway Stage gates Five (Delivery) and Six (Completion). As a result, Integrated Assurance Reviews at project closure are likely to become more routine.

Network Rail: IIPAG has repeated its recommendation that interfaces with external parties, particularly Network Rail, should be improved. In addition to major projects where rail lines are owned by Network Rail, many structures projects also include interventions on Network Rail assets. Many of the interfaces are well managed at the asset level, with knowledge of Network Rail processes now more widely shared across asset management teams.

IIPAG’s acknowledgement of best practice in a number of projects is noted.

2.3. Interim Reviews

IIPAG committed in its 2015/16 workplan to increasing its scrutiny of large projects, and it has done this for the Northern Line Extension and Four Line Modernisation (4LM, previously known as the Subsurface Upgrade Programme), in particular. Following the signature of the contract with Thales for the signalling upgrade for 4LM, IIPAG now writes quarterly updates on progress for TfL’s Finance & Policy Committee. IIPAG’s views on this programme are summarised in section 3.2. IIPAG’s involvement and advice on the Northern Line Extension is summarised in section 3.3.

Other projects or issues on which IIPAG has advised or undertaken Interim Reviews in the past year are listed below:

IIPAG Interim Reviews from April 2015 to March 2016
Victoria Station Upgrade (VSU)
Northern Line Extension (NLE)
Bank Station Capacity Upgrade
STIP 1 Update Review
NLE Supplemental Report
ATC Four Lines Modernisation (4LM)
London Overground Capacity Improvement Project LOCIP
NLE Supplemental Advice
4LM Interim Review
A23/A232 Fiveways

2.4. Project Progress Dashboards

In the reporting period TfL have recruited a specialist resource to assist them in developing their Dashboard reports and the Dashboards have been reconfigured. However, IIPAG believes that there is still work to do to ensure that all the reports provide the concise, up to date and accurate management information that should enable senior management to make a judgment as to the overall health of each project.

In the next twelve months IIPAG will continue to work with TfL to refine the reports to meet the above objective.

TfL Response:

IIPAG has recognised the recruitment of a specialist resource to develop the dashboard reports. The Integrated Controls Project will be progressed to provide a single planning and reporting tool that will improve the accuracy and consistency of reporting, including the project dashboards.

3. MAJOR PROJECTS AND PROGRAMMES

3.1. Approach

TfL's Investment Programme includes a number of projects or programmes that are extremely significant, either in terms of the value of the projects, their complexity or risks or their significance in delivering the Mayor's Transport Strategy. IIPAG has set out its views on the progress on a number of these projects in Sections 3.2 to 3.7. IIPAG has commented upon all projects that TfL is progressing that have an Estimated Final Cost around or above £1bn. These are:

- Four Lines Modernisation Automatic Train Control (previously known as the Subsurface Upgrade Programme ATC);
- Northern Line Extension (NLE);
- New Tube for London (NTfL);
- Silvertown Project;
- East of Silvertown River Crossings Programme;
- Crossrail 2; and
- Cycling Vision.

3.2. Subsurface Upgrade Programme Automatic Train Control (SUP ATC)

IIPAG has continued its close involvement with re-procurement of the Automatic Train Control element of the Four Lines modernisation programme (4LM ATC) (previously known as Sub Surface Automatic Train Control) through a two-man team comprising a specialist in signalling and communications systems and a co-opted expert in construction contracts. Up to July 2015, when London Underground agreed a contract with Thales, IIPAG met regularly with the engineering and commercial teams, reviewed the contract documentation in draft, and participated in London Underground's ATC Procurement Steering Group. IIPAG did not have any contact with the supplier. Since the contract was let, IIPAG has conducted two interim reviews of the ATC programme. Co-operation between London Underground and IIPAG has continued to be good. IIPAG has made many recommendations and most of them have been acted upon. This section sets out IIPAG's views of progress in 2015/16.

Pre-contract phase

In the pre-contract phase, IIPAG's aim was to ensure that the programme was positioned to deliver the project successfully and achieve best value for money, learning from past mistakes. IIPAG's focus included managerial, technical and commercial aspects, not only in relation to the main Supply contract but also the concurrent inputs by London Underground. IIPAG's objectives were to:

- Ensure the capability of both the proposed contractor and the London Underground team that would manage the contract, and of the London Underground teams dealing with enabling works, End State Track Layout alterations, and any other elements required was appropriate;
- Seek proof of the proposed system and the feasibility of its adaptation to the needs of the 4LM ATC;

- Clarify and ensure the adequacy of London Underground requirements stated in Works Information, including reconciliation with contractor proposals;
- Ensure that the interface requirements were adequately understood;
- Resolve any other technical issues; and
- Establish a contractual framework which promotes and incentivises collaborative working and the provision of a satisfactory Automatic Train Control System within an acceptable time-frame and at an economical cost, and that provides appropriate protections to London Underground.

The objective of appointing a capable contractor with a system that was demonstrably capable of adaptation to the needs of the 4LM ATC led London Underground to prequalify a single organisation. Thales pre-qualified as a potential contractor based on their successful ATC developmental work on the Jubilee and Northern Lines. IIPAG agreed with this decision but, as expected, there was then a protracted and challenging negotiation process. This improved both parties' understanding of what had to be delivered, and hence reduced risk, but resulted in an agreed Target Price that was significantly in excess of earlier estimates.

Incremental changes to the technical specifications continued to be made until the contract was let. Whilst IIPAG agreed that the specifications were adequate, they would ideally have been further simplified, better structured and hence made easier to understand.

IIPAG believes that the contract provides the basis for a successful outcome for both parties, but that this is highly dependent on collaborative behaviour being maintained. The Target Price must be seen as merely a figure by reference to which the pain/gain shares are to be calculated. The level of the initial Target Price should mean that both Thales and London Underground are incentivised to deliver a successful project for a final cost below the Target Price and thereby achieve substantial gain shares. It is important that all involved see such an objective and outcome as positive at all times.

Post contract phase

In the post contract phase, IIPAG allowed about 3 months before undertaking the first of a planned series of interim reviews in October 2015, and a further 4 months before conducting the second in March 2016. IIPAG plans to maintain a close watch on this programme in future through in-depth interim reviews at 6-month intervals. IIPAG will closely monitor areas of high risk or weaker performance in order to identify problems early and to provide advice on their mitigation and resolution.

There has been good progress with the establishment of London Underground and Thales teams, and a Programme Support Partner has been appointed and is engaged. Significant efforts are being made to encourage the right collaborative culture in the Thales and London Underground teams and this is to be commended. The teams are currently working well together, and IIPAG was impressed with the organisation of the engineering activity, and in particular the rigorous tracking of pre-contract actions.

The work that London Underground contracted Thales to do in advance of the main contract, at risk, has enabled good progress to be made with the Thales system design, and with the fitment of the test track in Leicestershire. Bombardier, Thales and London Underground have made good progress with fitting and running the first test train.

London Underground has made good progress with the enabling works, and with the related track alterations.

However, IIPAG raised a number of concerns in relation to Thales progress, Thales subcontracting, the train fit-out work by Bombardier, and interfaces with Network Rail.

There has been significant slippage against some of the internal schedule dates. In particular, Thales' installation work has been delayed. Whilst the delays have been absorbed in schedule float, and the published ready-for-service dates are unchanged, the loss of this scale of schedule float so early in the programme is a concern. London Underground is developing some improvement plans, and is looking at opportunities to save time later in the schedule. IIPAG will continue to monitor the position closely.

IIPAG has had some concerns relating to the establishment of appropriate and effective sub-contracting arrangements. Although primarily a matter for Thales, the subcontracting arrangements affect London Underground directly because payments by Thales to its subcontractors are reimbursed by London Underground under the Target Cost contract. In addition, delays in finalising subcontract arrangements affect the programme. London Underground has been collaborating well with Thales after the main contract was concluded to improve transparency and to help them to resolve these issues. However, IIPAG notes that the need for London Underground to be concerned with subcontracting arrangements under Target Cost contracts should be more fully recognised at the pre-contract phase for other projects.

The fitting of the ATC equipment on board the new fleet of S7 and S8 trains by Bombardier is a vital element of the 4LM ATC programme. A collaborative working relationship has been established between Bombardier, Thales and London Underground. IIPAG notes, however, the need for collaborative relationships to be supported by appropriate binding contracts.

There is a need for various technical and operational interfaces with Network Rail. These are not required until the later stages of the schedule, but IIPAG has asked London Underground to consider whether it is possible to address them earlier in order to mitigate the potential risks around these interfaces.

Other possible improvements

The costs of the telecommunications networks which underpin the ATC and the relationship between this investment and the other related activities of TfL, such as the forthcoming new Emergency Services Network, need to be further explored. IIPAG will continue to highlight the potential for improved efficiency in this area and advise TfL of potential solutions.

London Underground and its Programme Support Partner have identified opportunities for improving efficiency in the delivery of Thales' system and the London Underground -managed enabling works. IIPAG believes there is significant scope to modernise and mechanise some processes in order to improve on the schedule and final cost of the programme. IIPAG will closely monitor the opportunities plan.

Conclusion

The 4LM ATC is one of the most complex re-signalling projects ever undertaken on a Metro railway, and unavoidably includes some novel and unique features. The new team has got off to a good start, but it is a difficult programme and continues to represent a significant risk to London Underground. It is of fundamental importance that London Underground's senior management team continues to support this programme as a high priority, by providing access to the railway and rolling stock, timely agreement of detailed requirements, suitable human resources and new operational processes, in order that it can be delivered in accordance with its budget and schedule.

TfL Response:

IIPAG has continued to play a close and supportive role since the signature of the ATC contract and the programme team has always adopted their recommendations where they can be implemented. The Programme Director leading 4LM champions the importance of collaborative relationships; not just with the key suppliers, Thales and Bombardier, but also with a myriad of other sub contractors.

Since signing the Thales contract, the LU team has co-located with Thales at West Ferry Circus into "One team" areas grouped by delivery areas. LU has also established a Collaborative Leadership Hub, where LU, Thales and Bombardier meet on a four-weekly basis to discuss issues and drive collaboration. Changing the culture of the former SUP team into a collaborative team; fully understanding that their supplier is at the heart of their success; has been a significant change programme in itself and one that won the International Employee Engagement Award for 2016.

IIPAG's observations on Thales' subcontracting arrangements are accepted. The programme team has extended its collaborative efforts to ensure that LU's deep experience of the railway environment has been fed into the Thales sub-contract arrangements. This effort has been essential to ensuring an effective fit with the main contract. It also ensures that LU and Thales are fully aligned in contract management to avoid unnecessary levels of disallowed costs or potential disputes.

With hindsight, more could have been done with Thales to ensure the best fit between the main contract and the subcontractors at the pre contract phase – this crucial lesson will be embedded in the New Tube for London signalling procurement.

The programme team agrees that the fitting of ATC equipment onto the new fleet of Bombardier trains is a vital element of the 4LM ATC programme. Significant effort is being made to develop a collaborative relationship that maximises the engineering and leadership skills within Bombardier and Thales. A significant milestone achieved

was the “V1” prototype test train running at full speed at the test track in Melton. More recently, an intensive design period has enabled the first “V2 production train” commence the factory fit by the end the July 2016, by which time a fully binding contract will be in force.

3.3. Northern Line Extension (NLE)

The NLE programme includes a single Design & Build (D&B) contract for the main civil and fit out works of the two stations, 3km of twin tunnels, shafts and junctions together with works to be delivered by London Underground. The latter comprise rail systems, ticketing, rolling stock and system integration.

A formal legal agreement with the developer at Battersea (BPSDC) was reached in April 2014 defining funding and delivery obligations of the NLE. The D&B Contract was awarded in August 2014 and the Transport and Works Act Order (TWAO) was granted in November 2014. Late in the first quarter of 2015 it became apparent through TfL’s period dashboard reports that the NLE was suffering severe delay with associated significant cost implications.

IIPAG instigated an Interim review, which was held in April 2015, and issued a report making recommendations which fell into two categories: firstly, the immediate action required to establish an appropriately resourced project management team; and, secondly, that a review should be undertaken of whether any lessons could be learned for future schemes.

On the first recommendation, TfL have reported a more stable state has been achieved in recent months. Meanwhile appropriate decisions have been made to reschedule and reconfigure the works to minimize the impact on the overall programme, and site works have commenced. The management of the main works D&B Contract appears to be appropriate and effective.

On the second theme, TfL have commenced a review exercise to establish the causes of the delay which arose. This is not an independent review as recommended by IIPAG but IIPAG understands that an independent review may be considered in the future, subject to initial findings. This exercise, which IIPAG believe is essential, will inform all other projects where TfL’s new infrastructure acts as a catalyst for urban development and regeneration in response to the Mayoral Transport Strategy.

The negotiations with BPSDC of the commercial implications attributable to changes in the design require significant senior leadership and experienced resources. IIPAG have yet to receive the documented plan previously requested for the management of the relationship with BPSDC. This plan should define individual accountability and set out a pathway and timescale for resolving issues between the parties. IIPAG is not in a position to comment on the adequacy of management or strategy for the commercial negotiations as it is not privy to the substance or detail.

Over the last twelve months IIPAG have received further briefings from the project team and in turn have briefed TfL senior Directors. IIPAG issued two Supplemental

Reports in October and December 2015. The theme of IIPAG's recommendations has remained.

The NLE project remains of high concern to IIPAG and IIPAG will continue to seek regular briefings from the Sponsor, Project Director and the project delivery team.

TfL Response:

The TfL team has regularly briefed IIPAG on the recent developments and notes that the project remains of high concern to the group. Further briefings will be provided as appropriate.

3.4. New Tube for London (NTfL)

IIPAG has continued to monitor developments with this major scheme, which is expected to cost £16bn - a similar sum to Crossrail.

IIPAG undertook a review of the rolling stock procurement, and has had various briefings and discussions about the signalling and telecommunications elements of the proposed scheme. IIPAG's aim has been to ensure that mistakes made on the Sub Surface Upgrade ATC (Now known as 4LM Upgrade ATC) are not repeated, and that lessons learned in the re-procurement of the 4LM Upgrade ATC are transferred.

There have been some positive developments with this programme in the last year. A new team is in place and the specification for new rolling stock has been completed and is now in the market. Learning from the 4LM Upgrade ATC, TfL has committed to using a different contract form rather than the modified NEC contract used for the signalling and telecoms works on the 4LM Upgrade ATC.

However, IIPAG has identified a number of issues, and is working with London Underground to resolve them. These include concerns regarding:

- The relative timing of the procurement for the rolling stock and signalling elements. The rolling stock procurement is underway but the signalling is some way behind with a number of unresolved issues. An efficient outcome will be delivered only if the signalling strategy and scope are at a further advanced level before the train design commences. IIPAG believes that these key elements could and should have been co-ordinated better.
- The scope of the proposed signalling and telecommunications elements. Technology is advancing quickly, reducing the volume of hardware and its power consumption, and the intrinsic costs. Improved functionality such as driverless metro operations is rapidly becoming more commonplace. In these circumstances IIPAG is not convinced that it is necessary to commit to the supplier and the technology to be used for re-signalling of the remainder of London Underground lines for the next 20 years. A smaller scheme such as the re-signalling of the Piccadilly and Waterloo and City Lines might be more appropriate at this stage, with the contract for the Central and Bakerloo lines following at a later stage.
- The very limited pool of signalling suppliers. In order to maximise competitiveness and efficiency IIPAG believes that the scope could be divided

into a greater number of work packages. For example, there are a large number of vendors who could provide the fixed communications network to open standards.

IIPAG will continue to work with London Underground as the New Tube for London programme develops.

TfL Response:

The programme team has engaged regularly with IIPAG during the preparations for issuing the rolling stock invitation to tender and the development of the signalling pre-qualification questionnaire.

IIPAG makes reference to the alignment of the rolling stock and signalling procurements and resulting design. The programme team has aligned the dependant activities, including the introduction of “hold” points to ensure that the key design and interface activities between the rolling stock and signalling allow for efficient integration. This alignment approach and timing of the signalling procurement has been approved by the Finance and Policy Committee.

IIPAG has stated that TfL should not commit to the same signalling supplier and technology for all the lines. The planned procurements do not commit TfL to a single supplier – or a single technology – for all the remaining LU lines. The proposed approach would result in a firm commitment to a single supplier and technology for the Piccadilly Line only, with options for the other lines to be exercised in the future. This approach safe-guards LU against significant changes or improvements in technology.

IIPAG has highlighted the very limited pool of signalling suppliers. The programme team has developed the packaging strategy for the signalling procurement, which is designed to maximise market appetite and competition. The strategy identifies a number of options which can be removed from the core signalling contract scope and delivered separately if it is more advantageous from a cost, risk and delivery perspective. These separate procurement options include the fixed communications network referred to by IIPAG.

3.5. Silvertown Project

The Silvertown Project will deliver a new vehicular river crossing beneath the Thames and forms part of the TfL River Crossing Programme. The project comprises a new twin bore tunnel, roads, junctions and associated works to traffic management infrastructure and systems. This is a high value project for which consents are currently being sought through the Development Consent Order (DCO) process as it is classified as a Nationally Significant Infrastructure Project (NSIP).

There are many aspects of this project which are novel to TfL, including the design and delivery of a very large diameter tunnel in close proximity to the Thames river bed, establishing the safety requirements for a new road tunnel, obtaining powers

through the DCO process, procurement through a Private Finance Initiative (PFI) and partial funding through new charging on the Blackwall and Silvertown road tunnels to meet a funding gap. In May 2015 TfL commissioned Infrastructure UK (IUK) and the University of Leeds to undertake an IUK Routemap Review. Their findings commented on TfL's ability to cope with these novel aspects and identified a number of issues, many of which align with IIPAG's general systemic concerns over adequacy of sponsorship, organisation, governance and definition of project requirements.

Over the past twelve months the project team has been enlarged and strengthened to cope with the immediate objectives of submission of the DCO application and the commencement of the procurement of a PFI concessionaire responsible for 'Design, Build and Maintain'. In addition to instigating an Interim Review IIPAG also receives regular formal and informal briefings from the Sponsor and Project Team and welcomes the pro-active nature adopted by the project team.

There has long been a basic assumption by TfL that there is no allocation of funding in the TfL Business Plan for this project and that user charges will only be generated once the scheme is operational. As TfL sees no opportunity to re-allocate funds as part of wider investment prioritisation it considers that it has no choice other than financing through a privately financed solution. IIPAG is of the opinion that this project is not suited to achieve the full benefits of a PFI and as such the chosen method of finance is most unlikely to deliver best value for money.

TfL Response:

IIPAG has rightly identified a number of significant challenges associated with the Silvertown scheme, which will construct a very large (12.5m diameter) twin bore tunnel close to the river bed in challenging ground conditions. The land sites also include significant issues, including contaminated land due to previous industrial uses and unknown ordnance that could include unexploded bombs.

Delivering the project through a PPP mechanism enables TfL to transfer the risk associated with the tunnelling activity to the private sector. In addition, the PPP company will be responsible for the availability of the tunnel over the life of the concession period, ensuring that the design and delivery follows a whole-life approach. Furthermore, the PPP company will only begin to make a return on its investment once the tunnel is available for use, providing a strong incentive to deliver to time and to budget.

For these reasons, TfL considers that the Silvertown Tunnel is better delivered through a PPP arrangement rather than through a traditional procurement method.

The use of a PPP also provides the most viable finance option. It would not be possible to finance the Silvertown Tunnel within the current business plan without deferring or cancelling other significant projects. It should be noted that TfL will retain responsibility for the user charging element of the scheme (covering both the Silvertown and Blackwall tunnels).

3.6. East of Silvertown River Crossings Programme

In June 2015 IIPAG received a briefing on the latest developments on the proposed river crossings east of the Silvertown road tunnel and noted that there had been changes to the proposed form of the structures and costs which were substantially different to the Assessment of Options Report issued by TfL in December 2012. Subsequently TfL have undertaken a public consultation on a crossing at Belvedere and Gallions Reach. This was the fourth consultation in 3 years. IIPAG is concerned that public consultations have occurred with specific solutions prior to schemes being subject to a full Assurance Review involving TfL Project Assurance and IIPAG. An Initiation Integrated Assurance Review (IAR) by TfL Project Assurance planned to occur in November 2015 has been delayed by 6 months. IIPAG will continue to seek an overview of the strategy for this programme and its interaction with other projects such as the Silvertown project and decisions regarding the Woolwich Ferry.

TfL Response:

The Integrated Assurance Review (IAR) for the river crossings east of Silvertown was not pursued at the end of 2015 when it became clear that candidates in the forthcoming Mayoral election were proposing alternatives from those pursued by the former Mayor.

Since his election in May, the Mayor has confirmed that he will review his river crossings priorities with a particular focus on air quality, new housing and affordability. The review will consider which options best meet the new priorities. An IAR (with IIPAG) will be arranged once the new priorities are confirmed.

3.7. Crossrail 2

The Crossrail 2 Scheme is an extremely significant project with the cost of the entire programme likely to exceed £27 billion at 2014 prices. Recently IIPAG received a formal briefing from the project team to report on progress since a TfL Integrated Assurance Review held in October 2015. The current team and leadership were established in the first quarter of 2015 and, despite the team's relatively modest size, it has achieved major progress. During the last 12 months a public consultation has been undertaken and Crossrail 2 Ltd and the Growth Commission have been established. In addition it submitted the Strategic Outline Business case to DfT and provided input to the Government's Autumn Comprehensive Spending Review. The Chancellor deferred the development funding decision pending publication of the National Infrastructure Commission's (NIC) first report. This has subsequently recommended that Crossrail 2 be taken forward into the development phase. The key recommendation from NIC is that funding should be made available to develop the scheme for a single preferred option to permit the submission of a hybrid bill in autumn 2019. Whilst this is later than originally anticipated, IIPAG recognises that it results from the Government's programme for HS2 and its subsequent phases.

Although this is a TfL led project it requires the full involvement of Network Rail and thus a DfT/TfL Joint Sponsor Board will be established. As part of the emerging

governance, which establishes various Boards, the principles for Assurance need to be defined. The DfT has advised IIPAG that a key principle for the assurance of Crossrail 2 is that it will be joint as far as possible. This is to ensure that it is streamlined, the project can be delivered in the most effective and efficient way, and to recognise it as a joint project between DfT and TfL. IIPAG looks forward to playing its part in the Assurance of this prestigious project.

TfL Response:

The high level governance structure for Crossrail 2 has been agreed for the development stage, with the Joint Sponsor Board now in place. Discussions have also been held on the assurance requirements of each sponsor to ensure that the review interventions are coordinated and do not overlap. A joint assurance framework will be proposed to the Joint Sponsor Board as soon as possible.

3.8. Cycling Vision

IIPAG has continued to review cycling schemes during the year and, whilst significant progress has been made in building the Cycle Superhighways, they are still in construction and results, both in final costs and their subsequent use when completed, are not yet available. Progress with the other Borough-led cycling projects (Cycling Grid, Quietways and Mini-Hollands) has been slower than planned with spend and work completed to date behind schedule. No results of outcomes are yet available, but IIPAG has been pressing for any early results to be made available such that lessons from these early schemes can be made. One clear lesson learned is that Borough led schemes take more time to develop and deliver and this should be factored into the aspirations for the Cycling Vision.

TfL Response:

IIPAG correctly stated that the three Cycle Superhighways were still in construction during the period covered by the report. Since then, the three routes were opened in April and May 2016, just three years from their inception in the Mayor's Cycling Vision in 2013.

The monitoring strategy and plan for the cycling vision is now well established. Baseline counts for the Superhighway and Quietway routes have been completed. Early counts on the three new superhighways (East-West, North-South and CS5 Inner) show that cycling trips have increased by an average of 60 per cent over the pre-construction levels. Counts in May 2016 found that cycles accounted for 52% of all traffic on Victoria Embankment (E-W) and 70% of all traffic on Blackfriars Bridge (N-S), during the morning peak hour (8am-9am).

The monitoring programme is also designed to measure the wider benefits of the cycling portfolio, including the impact on modal shift, public health and road safety. The Cycling Outcome Board will review the monitoring results and benefits as they mature.

In relation to the borough programmes in the Cycling Vision, IIPAG is correct in stating that the overall progress has been slower than originally planned but the progress in some boroughs has been very good – the programme-level picture masks some of the borough level successes.

The scale of delivery in the initial years has been challenging, given the nature of the projects, the necessity of building political and public support, and significant prior cuts in borough capacity. In many cases the programme was being delivered almost from a standing start.

Drawing on the lessons from the initial two years, the Cycling Vision Team is taking a number of steps to strengthen the programme management. The 2016/17 budget setting with the boroughs has been more detailed, including more rigorous assessments of borough cost estimates, using actual cost data from the early schemes and commercial resources from other delivery teams across Surface Transport.

Design Reviews for major borough schemes will be carried out to challenge the costs and encourage value engineering, again drawing expert resources from other Surface Transport departments.

TfL has also begun liaising with the boroughs to promote a more value for money ethos, to enhance transparency and to provide a clearer line on the removal of funding where the quality or progress is not sufficient.

4. SYSTEMIC ISSUES

4.1. Introduction

IIPAG has continued to address a number of issues that have a wide impact on the business performance of TfL. IIPAG has examined these systemic issues with TfL separately to its project reviews in order to achieve the necessary focus, and some have been the subject of specific IIPAG reports.

IIPAG has pursued the following systemic issues in the last year:

- Sponsorship and Project Initiation;
- Organisational issues and External Expert Reviews;
- Governance;
- Procurement and Commercial;
- Research and Development;
- Commercial Development and Secondary Revenue;
- Telecommunications;
- Standards and Specifications;
- Project Overheads;
- Carbon footprint; and
- Non-Permanent Labour

4.2. Sponsorship and Project Initiation

IIPAG understands that the TfL Sponsorship Capability Programme has continued during the last year and acknowledges that in many cases there has been an improvement in the performance of the Sponsor.

TfL's response to IIPAG's 2014/15 Annual Report indicated that it would assess the need for further work on sponsorship in the very early stages of projects and that this would be captured in the Pathway refresh project. IIPAG have seen a draft handbook defining the principles and framework for initiating projects and programmes in TfL. IIPAG welcomes these developments, however IIPAG continues to witness projects where issues become apparent at later stage that should have been recognised and addressed during the initiation phase.

Typically projects are conceived within the TfL Transport Planning and Strategy Directorate, which has unfortunately recently suffered from the departure of its two most experienced directors. IIPAG believes that the process to obtain powers through the various processes has been led extremely well by this group, but IIPAG believes that the engineering and planning could more often been undertaken using expertise within the affected business units. Currently, TfL Transport Planning and Strategy often supplement their own engineering and planning abilities by procuring support from external consultancies. IIPAG considers that, on occasion, better value could be achieved if the two operational and asset Directorships of Surface Transport and Rail & Underground were actively participating in the identification of options and the development of engineering solutions.

In addition to increased involvement in these formative stages IIPAG considers that the transfer of accountability from Transport Planning and Strategy Directorate to the

Business Units could occur at an earlier stage. Furthermore, the approach to sponsorship and delivery subsequently adopted by the Business Units could be more clearly and consistently defined across TfL.

Currently, there is a fundamental difference between the approaches to Sponsorship in the different Business Units of TfL once they are accountable for the development to achieve a preferred single option. In Rail and Underground there is a clear separation between the roles of the Sponsor and the Delivery unit. The Sponsor defines the need, the business benefits, defines the requirements, creates the business case and obtains funding and powers. The Delivery unit is accountable for the development of the solution and it manages the engineering, planning and design.

In Surface Transport the separation between sponsorship and delivery is less clear. Accountability for managing the development of the single option lies with the Sponsor who utilises either in house engineering resources or procures external consultancy. IIPAG believes that greater efficiency would be achieved if Surface adopted the Rail and Underground model. In IIPAG's view TfL's Governance process should insist upon the early separation of the roles of Sponsor from Delivery consistently across TfL.

TfL Response:

IIPAG recognises the further improvements in TfL's sponsorship capability. IIPAG commends the expertise of the Transport Planning and Strategy Department in obtaining legislative powers for major schemes but recommends that the engineering and planning resources in Surface Transport and London Underground could be engaged earlier in the project development. The creation of a Major Projects Department in 2016 will clarify the roles, responsibilities and interfaces across departments, ensuring that the TfL expert resources are optimised for major projects.

The Sponsorship Capability Improvement Programme has generated a number of specific work streams in Surface Transport. A Surface Sponsorship Steering Group has been established to ensure consistent practices across the department. Mandatory training is provided to address capability or knowledge gaps. Sponsorship champions are also in place to provide ongoing support and advice.

The Pathway Project Management framework has been revised to include a dedicated section for Surface Transport that clearly defines the roles and the tasks performed by the sponsor and deliverer throughout the project lifecycle. The Pathway framework has also been strengthened to include a more detailed section on the Initiation stages of projects, where the sponsor's role is the most critical.

The high level network requirements have been developed with input from all the Surface planning teams, including Buses, Road Space Management and Asset Management, which will be captured in a strategic business case. The handover process from the Surface Strategy and Planning Group to the sponsor teams has also been clarified.

4.3. Organisational issues and Assurance

Organisational Issues

As noted in IIPAG's 2014/15 report, in 2013 IIPAG conducted a review of the effectiveness of the TfL's Programme Management Office (PMO) and submitted a report in November 2013 recommending that the PMO be restructured. The two key recommendations were:

- Move the reporting line for Assurance to only the Finance Directorate instead of the dual reporting lines to the Director of Capital Programme and the MD Finance, and to improve its effectiveness; and
- Restructure the remaining PMO into a smaller more focused groups.

TfL's response, as submitted to the Finance and Policy Committee (FPC) In April 2014, rejected the first recommendation and whilst agreeing in part to the second recommendation little action was taken. In December 2014 following the assessment of the ATC programme by KPMG; an EC Harris report on Assurance; and the directive from a Special Purpose Subcommittee of the FPC; TfL decided to reorganise the PMO in line with IIPAG 's recommendations. During 2015 the PMO was reorganised to separate Assurance to have a single reporting line to the TfL MD Finance and a reassessment of activities of the other departments which formed the PMO.

The EC Harris report for the FPC Special Purpose Sub-Committee reviewed the assurance and approval processes of TfL investment programme and compared them with other similar organisations.

The Special Purpose Sub-Committee highlighted the need for three levels of change:

- Organisational reporting lines;
- Structural changes to the three lines of assurance defence (Project, TfL Assurance department and IIPAG) together with an improvement in skills and competencies; and
- A cultural change to ensure that within TfL there is recognition of the value of Assurance and to aspire to "world-class" project delivery.

The three topics are closely aligned with IIPAG's regularly expressed opinion that there is a need for greater rigour in the governance of projects to ensure decision-making is based on accurate and assured data.

The above is largely as reported in the IIPAG's 2014/15 Annual report. Whilst IIPAG welcomes the changes in respect of the PMO and Assurance it remains a concern how long TfL takes to affect change. Over the past six years, in addition to IIPAG's work, TfL has commissioned numerous reviews by external consultancies into such topics as assurance, organisational effectiveness, delivery capability, project sponsorship. On the occasions where change is instigated following a review it appears that TfL's culture and organisational structure soon limits a speedy application and thus constrains the effectiveness of the change initiative.

In recent months a new Head of TfL PMO has made significant changes to the structure of the PMO. In March 2016 IIPAG were issued the draft of the PMO Transformation Strategy and its stated vision for 'TfL's First line of Assurance to be recognised and respected across the business'. It is evident that there has been a concerted effort to address the observations and recommendations made by IIPAG following its review on 2013 as well as those by other independent consultancies.

The new PMO will be structured with five main functions namely:

- Reporting;
- Controls;
- Best Practice;
- Business Engagement; and
- Change Project Services.

These five main functions are supported by a common set of four core principles:

- Building Enhanced Capability;
- Strengthening Accountability;
- Improved Transparency; and
- Increased Predictability and Confidence.

The PMO Transformation Strategy appears to be a good response to the needs of TfL and, whilst the PMO remains a relatively large organisation, IIPAG agrees in principle with the strategy. As stated in the strategy document its success will be measured through the realisation of benefits to the Delivery Teams, hence its success is primarily dependent on the business acknowledging the need to improve its delivery activity and accepting the assistance that the PMO can offer. The new PMO reports to the two Operational and Capital Programme Delivery units, one in each of Rail & Underground and Surface Transportation. IIPAG notes that the application of controls and reporting and compliance with quality processes and procedures are equally applicable to the TfL Corporate and delivery departments. IIPAG have observed occasions when projects experience unforeseen cost increases arising from mistakes in the output from these corporate and functional teams. It is important that all levels of Assurance are applied consistently across the whole of TfL.

Accountability for the delivery of an assured product remains with the Teams within the various TfL Directorates. It is therefore essential that the various TfL Directorates do not view the PMO, which is developing suitable processes and assisting project teams, as the First Line of Assurance.

IIPAG will continue to monitor the development of the PMO and its objective to improve the First Line of Assurance, and in association with TfL Project Assurance seek to strengthen the three Lines of Assurance.

Assurance

From January 2015, when the reporting line for Assurance was changed to the MD Finance, IIPAG have supported the development of new strategy and plan for TfL

Assurance which provides the '2nd Line of Defence' independent of the project. The accepted best practice for project assurance calls for three lines of assurance. The first line is provided by the project itself as described above and the third line is provided independently of the organisation and is fulfilled by IIPAG. In addition to the event based Assurance reviews in support of the Pathway governance process TfL Project Assurance now plan to provide a more continuous project assurance which is proportionate to the risk exposure across the investment programme. IIPAG have been briefed on the process to determine the schedule of projects which warrant targeted assurance reviews. It is anticipated that the initial schedule will be available by first quarter 2016/2017.

Following the approval of a Business Plan and the granting of additional financial authority the implementation of the New Assurance Service commenced. The recruitment for a restructured TfL Project Assurance department is largely in place and will be complete in the first quarter of 2016/17.

IIPAG is supportive of TfL Project Assurance and will continue to work closely with its development of the New Assurance Service and its stated aim of improving TfL's 2nd Line of Assurance. But as noted in IIPAG's 2014/15 Annual Report:

It is important that within all parts of TfL there is compliance with the project management processes which have been approved for application. This requires individuals to be trained, to have the appropriate competencies and for senior management to insist that there is compliance.

Change must be supported throughout an organisation.

TfL Response:

TfL welcomes IIPAG's endorsement of the PMO Strategy (April 2016) and the progress made in re-defining the role of the Programme Management Office. The implementation began in May 2016.

IIPAG's assessment of the PMO being a relatively large organisation pre-dates the structural review, which assessed the capability, activities and resources required to engage and guide the first line assurance in the programmes. The new structure is leaner, with significant reductions in Non-Permanent Labour (NPL) and a total staff cost saving of 22% against the 2016/17 budget.

The Business Change Project Services Team comprises over half (54%) of the total PMO headcount (excluding apprentices). The team provides project management resources to operational projects, including Fit for the Future Stations and other major change programmes, with all the costs recharged to the projects.

IIPAG recommends that assurance is applied more consistently across the whole of TfL including TfL Corporate and delivery departments. The PMO Strategy includes corporate departments in its objectives to strengthen partnerships with Sponsors, Operations, Corporate Planning, Business Planning, HR, Commercial and Finance. These relationships are being defined in more detail through the lifecycle

improvement work.

IIPAG reiterates that the accountability for the delivery of an assured product remains with the sponsor and delivery teams; and that the TfL Directorates should not view the PMO as the first line of assurance. The PMO Strategy is completely aligned to that view, emphasising that the majority of first line assurance should take place within the delivery environment but that the PMO will ensure a consistent approach and provide support. It will also ensure that trends and themes emerging from the second and third line assurance are effectively addressed across TfL.

Assurance: IIPAG has provided significant input and support to the development of the new assurance framework, based on the industry standard Three Lines of Defence. The TfL Project Assurance team has almost doubled in size since 2015, to 15 staff, in order to deliver the New Assurance Service at the Second Line of Assurance. In particular, the Continuous Assurance is now in place, covering over 60 projects and programmes. Project Assurance staff now attend programme boards, not only to monitor the progress of the projects themselves, but also to oversee the effectiveness of the First Line of Assurance to the boards.

As the Continuous Assurance develops, the risk-based approach to Integrated Assurance Reviews will become better informed, enabling more effective and efficient review interventions. As a result, the cost of External Expert resources is likely to be reduced by up to one third in 2016/17.

The Head of TfL Project Assurance reports directly to the Chief Finance Officer, providing a clear mandate for compliance and assurance across the delivery directorates.

4.4. Governance

All projects are governed by in-house TfL project or programme boards. It is evident to IIPAG that not all Project Boards are as effective as they should be. Project Boards should be accountable for providing clear direction, constructive challenge, resources and to ensure that changes to the brief receive additional funding where appropriate. Lack of compliance with TfL's processes and procedures should not be tolerated by the project Boards. Upward reporting on progress and performance should be honest and accurate. Shortcomings in these aspects result in the higher Boards of Governance receiving reports or applications for funding of poor quality. IIPAG has noted a number of issues that could and should have been effectively addressed by effective boards on a range of projects in both Rail & Underground and Surface Transport. Examples from specific project reviews are:

- *Resources:* The lack of a stable and adequately resourced management team and in particular the position of Lead Commercial Manager;
- *Scope:* Permitting a change in scope without consideration of additional funding;
- *Insufficient challenge:* The balance between the cost of limited access against the benefit to the public from unconstrained construction access was not properly challenged; and

- *Strategy*: A lack of challenge to the high level strategy of a major programme, where approaches used in previous programmes were to be applied with insufficient evidence that they were appropriate.

TfL Response:

IIPAG has observed that project and programme boards may not be consistency effective across the delivery directorates. The programme board governance structure is more mature in London Underground but significant recent progress has been made in Surface Transport. Consistent Terms of Reference have been agreed for all project related boards across all the Surface directorates. Four portfolio boards have been established, covering assets, service operations, major highways enhancements and network performance and safety.

The programme scope and resources are included in the standard terms of reference for programme boards but it is recognised that more emphasis is required to ensure that the resources are stable in some cases. TfL Project Assurance will attend the boards in order to oversee the First Line of Assurance activities and to advise on the Boards' effectiveness. The new governance structures will be in place by September 2016.

4.5. Procurement and Commercial

2015 was a year in which IIPAG witnessed steady, albeit not spectacular, progress in relation to TfL's performance in procurement and commercial matters. There were exceptions to this, notably with regard to the works on the Northern Line Extension programme, upon which IIPAG has commented in section 3.3. However, IIPAG considers that project teams are now more focused upon commercial issues than they have previously been and are more willing to seek solutions within available funding rather than instinctively seeking extra funding. Further progress is required in this area.

On a number of projects TfL has adopted novel means to manage the commercial aspects of particular projects, examples being the use of a conflict avoidance panel and early contractor involvement. TfL has claimed to have made significant savings as a result of such initiatives and IIPAG will welcome the opportunity to review the projects in question to ascertain whether the claims made are justified and, if so, to look at how they may be applied more broadly.

In its 2015 report IIPAG commented upon the progress made by TfL in understanding its base costs and developing its related estimating capability. IIPAG has witnessed further improvement in this area and considers those involved should be commended for their efforts. These should enable TfL to provide better quality and more accurate estimates of its likely costs, both during pre-bid budgeting and post contract administration of project changes.

In its 2015 Annual Report IIPAG undertook to review the cause and effect of cost increases experienced by TfL on projects. TfL undertook a similar exercise itself during the past year and, rather than have parallel exercises ongoing at the same time, IIPAG engaged with TfL as TfL progressed the task. This is a major piece of work and is not currently complete. However, it has provided interesting results to date that indicate that such forensic analysis can and should drive cost savings and greater efficiency going forward. An example of this is an analysis of station works contracts at Tottenham Court Road, Victoria and Bond Street where it was identified that, on average, across the three contracts 23% of the cost of changes implemented post contract related to changes to Works Information which had resulted in “non-value adding scope creep”. These were defined as “changes to Works Information to achieve the originally intended project benefits, arising from omissions or incorrect requirements definitions in the Works Information These do not add value to the project, or add less value than their cost, due to late specification, abortive work or nature of the requirement”. Thus, significant cost savings and enhanced value can be obtained by focusing pre-contract on those areas affected post contract by such omissions or incorrect requirements.

IIPAG has previously expressed concern with regard to the number of revisions and additions to the standard NEC terms (Z clauses) implemented in its contracts by TfL. These had grown over time to more than 300, many of which no longer served a purpose. Further, issues commonly experienced by TfL in the administration of contracts were not addressed at all. Accordingly, a review was undertaken to reduce the number of revised/additional clauses and ensure the applicable terms were fit for their purpose. IIPAG liaised with TfL in relation to this exercise and provided comment upon that proposed. IIPAG has not seen the final product in this regard and looks forward to doing so over the course of the coming months.

TfL uses the NEC contract terms across much of its portfolio of products. However, that portfolio is so diverse that IIPAG is concerned that such terms are not always the best option available since 'one size doesn't fit all'. IIPAG considers this is a matter that should be subject to review over the coming year.

TfL Response:

IIPAG recognises that overall progress has been made in strengthening the procurement and commercial functions, with an increased commercial focus within the project teams.

IIPAG also recognises the use of Early Contractor Involvement (ECI) and Conflict Avoidance Panels (CAP), as used on major project including the Tottenham Court Road and Bank Station upgrades. Although relatively new to TfL, the CAP process has been used by other agencies, including the Olympic Delivery Authority and Network Rail. TfL will work with IIPAG to review the effectiveness of the CAP and ECI mechanisms when the relevant projects have been completed.

TfL welcomes IIPAG’s recognition of the progress made in understanding base costs and developing estimating capability. Significant work is underway in both London Underground and Surface Transport to develop standard rates for “repeatable work

items” and other estimating tools.

TfL will continue to work with IIPAG on the causes of cost increases in projects. It is accepted that cost savings and enhanced value could be better secured by directing more focus on the requirements in advance of the contract award. However, it is not always possible to undertake intrusive surveys pre-contract or to identify inaccurate asset location information provided by third parties. Furthermore, some non-value adding change cannot be foreseen – over 10% of the non-value adding changes for the three major station upgrades (Tottenham Court Road, Bank, Bond Street) related to the extended embargo on works during the Olympics.

IIPAG has expressed concern at the number of revisions (known as Z clauses) to the standard NEC contract, which is the default construction contract form in TfL. The existing NEC clauses have around 150 Z clauses, with a further review nearing completion. TfL accepts that one form of contract is not universally appropriate. A bespoke contract for the New Tube signalling contract is being developed, which should be a useful precedent for projects that include major applications of technology.

TfL will work with IIPAG to review the use of the NEC contracts, accepting that there is no single off-the-shelf form of contract for all construction works. The focus should be on setting clear requirements, achieving consistency in the terms used by TfL (to avoid confusing the supply chain) and setting appropriate Z clauses rather than focusing on the relative merits of various industry forms of contract.

4.6. Research and Development

TfL introduced an innovation portal in March 2013 in order to develop new technologies and new approaches in areas including: customers, value, delivery, reliability, safety and people.

IIPAG has seen little evidence of:

- How the portal is monitored;
- The benefits that have accrued from this initiative; and
- Recognition of individuals and companies that have contributed to the portal.

TfL is investing in new technology; most notably in the area of plant for track renewals and maintenance and this has delivered some efficiencies. Overall, however, IIPAG has not witnessed a culture of innovation across TfL. There is no acknowledged leader of innovation and the subject does not appear on senior board agendas. Progress is generally made by individuals who have access to funds to develop new ideas in their own specialisms.

IIPAG believes that TfL should appoint a Director responsible for promoting/leading innovation across the infrastructure business. That individual should have access to an innovation fund. Individuals and teams should be encouraged to submit applications to develop ideas that will improve the business in the areas listed above.

TfL Response:

An Innovation Team was established within the Engineering Directorate in Rail and Underground in 2015. The London Underground Innovation Council was also created as a strategic board-level body. Ideas are submitted through the Innovation Portal. Each month, "Innovation Times" is published, providing an update of the basic statistics and news of the latest innovation developments. A simple evaluation model is used to select proposals for initial development, without the need for a detailed business case or full project structure. Significant ideas include laser scanning of tunnels, asset inspections using drones and energy storage using recycled car batteries.

Similarly, a Surface Innovation Fund was established in January 2016 and has provided seed-funding for a number of initiatives, including USB smartphone chargers on the Cycle Hire bikes.

A pan-TfL Innovation Hub has been created to encourage and coordinate innovation, both across TfL and externally.

External engagements have resulted in a number of grants totalling over £1m, from Innovate UK and the DfT. A notable success has been a concept trial of "Wayfindr" – a system that enables visually impaired people to navigate the underground. National media coverage was followed by a multi-million dollar donation from Google. Other avenues of development include energy storage modelling and using aerospace materials on trains to reduce weight and energy consumption,

A number of collaborations have also been established, including in-kind effort from McLaren Applied Technologies and the Open Data Institute.

The Innovation team now coordinates the effort across TfL and enjoys visible support from the Managing Directors. TfL would be happy to provide further briefings to IIPAG on the work to date and the possibilities for the future.

4.7. Commercial Development and Secondary Revenue

In May 2015, TfL's Commercial Development directorate set up a Commercial Development Advisory Group (CDAG) based on the IIPAG model. The Chair of CDAG is Francis Salway, previously Chief Executive of Land Securities, the UK's largest property company. The initial view is that CDAG is working well and providing valuable support to TfL's ambitious plans to deliver significantly increased revenue from its asset base.

TfL Response:

Noted.

4.8. Telecommunications

Telecommunication underpins all of TfL's operations and costs at least £300m each year to run, with many more millions spent within capital schemes. IIPAG has been highly critical of TfL's fragmented management arrangements for telecoms over four years and has repeatedly highlighted what it believes is scope for significant savings in excess of £100m per annum.

Whilst the vast majority of the problems remain, with too many suppliers and too many networks still in place, there are at last some serious efforts being made to sort this out.

TfL made significant improvements to the leadership of telecommunications and IM early in 2016 and considerable senior management energy is now being applied. The business is in the early stages of addressing the issues that IIPAG raised and IIPAG welcomes this effort, which it will monitor closely.

The distinction between telecoms networks and the applications that run over them now appears to be understood, and it has been declared that the historic practice of building a new telecoms network for each new application is ended. Controls are being put in place to restrict further network proliferation.

Work is underway to produce a TfL-wide strategy for telecommunications, which will point the way to a drastic reduction in the number of suppliers of telecoms services, and will consolidate the in-house networks to improve efficiency and security. TfL has recognised that some quick decisions are needed regarding the telecoms networks which are soon to be installed as part of the 4LM upgrade in order to ensure that these are optimised to suit TfL's wider telecoms needs, without adding intolerable risk to the 4LM programme. The approach to telecoms on the New Tube for London also needs to be better aligned with the emerging TfL telecoms strategy and decisions about the future of the Connect PFI also need to be made soon. These three major issues are all related – as each will impact on the others. IIPAG will continue to encourage progress in these areas.

Some savings have already been identified TfL has acknowledged that a re-organisation is necessary. IIPAG hopes that the business will now set up the single dedicated team to be responsible and accountable for telecoms across TfL, as IIPAG first recommended in 2013.

The TfL Telecoms team should be built by collecting together the people with telecoms expertise who are scattered across the business to form a critical mass. It is likely that this team will need to be augmented with IP network specialists. This team needs good leadership and should be distinctly separate from the IM team. The telecoms team should be competent to manage the telecoms strategy, the in-house networks, the future of the Connect PFI, the many make/buy decisions that are in prospect, and to assess the opportunities for the commercial development of telecoms at TfL.

This team will also have to address the issues around the use of open telecoms networks for railway signalling on the London Underground, where discredited safety arguments continue to be used to prevent progress and improved cost efficiency.

The recommendations that IIPAG has made for the improvement of telecoms at TfL over the last four years remain highly relevant in order to save money and improve service. IIPAG will work with the new leadership team to help bring about the radical improvements that TfL now agrees are both necessary and achievable.

TfL Response:

A great deal of work has been undertaken to construct a viable approach to the sub-optimum and fragmented nature of TfL data networks. The TfL Technology and Data Group was established under the leadership of the Managing Director, Customers, Communication and Technology. IIPAG now has full representation on the Group and will play a crucial role in the development of the pan-TfL Telecommunications Strategy.

4.9. Standards and Specifications

IIPAG has not examined this topic in any detail in 2015/16. IIPAG has been advised that although work on rationalising the telecommunications standards has been delayed due to a change in resource priorities, work on rationalising the Category 2 standards on passenger rolling stock has been completed. A single, albeit long, standard has been produced, giving specific requirements together with the underpinning reasoning. Whilst this standard is not intended for issue as part of contract documentation, it has provided information for the specifications which have been prepared for new rolling stock for the additional trains for the Jubilee/Northern Line and the New Tube for London projects.

TfL Response:

IIPAG notes that a single standard for London Underground rolling stock has now been completed. The standard is long, as IIPAG states, but for the first time, all the components are in one place, enabling project specifications to be drawn up from a single source, eliminating unnecessary requirements.

4.10. Project Overheads

In the last year TfL has examined how it allocates management overheads for Capital Projects and has developed an approach that will likely capitalise slightly more of its spend from within its Capital Projects Directorate. However, comparisons of these levels of overheads with those delivered elsewhere have not been undertaken. IIPAG understands that this will take place in the next year and will closely follow this via its benchmarking role. IIPAG has commented upon the importance of TfL understanding its staff costs, including its central overheads and other costs in addition to its base staff costs, for many years. IIPAG remains of the view that this is fundamentally important for TfL. Without a comprehensive view of staff costs it is not possible for the business to come to a well reasoned and comprehensive view of the most appropriate strategy to resource its Investment Programme.

TfL Response:

Overheads are now more comprehensively captured, with most project staff, including sponsors, using timesheets to record their costs as part of the project. A review of overheads – including central costs – will be carried out in the current year. Briefings on the benchmarking methodology and results will be provided to IIPAG as the work progresses.

4.11. Carbon footprint

The Infrastructure Carbon Review (ICR) was published by HM Treasury in November 2013, and set out actions for governments, clients and suppliers to reduce carbon emissions from the construction and operation of the UK's infrastructure assets, in line with the UK's climate change commitments.

TfL is currently one of the UK's largest investors in infrastructure. The ICR invites individual organisations to make specific commitments linked to their own activities which support the Review's objectives. The ICR therefore provides TfL with the opportunity to demonstrate its commitment to reducing the CO₂ impacts of its activities, and to collaborate with other large infrastructure managers to achieve this.

The London Underground and London Rail Board (LU&LRB) endorsed the ICR in January 2015, joining organisations such as Network Rail, Crossrail Ltd and Highways England as well as government bodies and major construction companies. Endorsement of the ICR commits LU&LRB to reduce infrastructure carbon (both operational and capital) through:

- Leadership – to create the environment and imperative for change;
- Innovation – to be the engine of change; and
- Procurement – to provide the mechanisms that allow the supply chain to respond.

LU&LR is contributing to the development of PAS2080, "Carbon Management in Infrastructure". The PAS is designed to support the ICR's objectives, by defining good practice for infrastructure carbon management, and will provide an accreditation framework for major infrastructure owners. The draft PAS is currently going through consultation and will be publically launched in spring 2016.

In January 2016 the Directors of the Rail and Underground Board endorsed the following ICR commitments:

- 1) To minimise the impact of service and infrastructure upgrades on overall energy consumption
 - a) Target energy neutrality of service upgrades through utilising new technologies to improve traction energy efficiency and reduce the need for cooling. This was achieved for the Victoria Line Upgrade and is included within sponsors requirements for NTfL Programme;
 - b) Define clear operational carbon targets within service upgrades programmes; and
 - c) Utilise whole life cost benefit analysis to ensure energy efficient assets are used in stations, depots and supporting operations.

- 2) To measure, monitor and seek to reduce the carbon emissions associated with major project delivery, working closely with suppliers to identify innovative ways to reduce emissions and improve project value
 - a) Build whole life carbon into projects, working towards the medium term goal of accreditation to PAS2080 and focussed initially within the Construction portfolio of CPD;
 - b) Build capital carbon reduction into procurement requirements, through appropriate incentivisation of associated value; and
 - c) Collaborate with suppliers and stimulate innovation through incentivised procurement processes and project delivery.
- 3) To utilise existing infrastructure more efficiently by making use of waste heat from London Underground tunnels to support London's energy needs.

IIPAG supports this initiative and recommends that it is taken TfL wide, under the leadership of a nominated responsible Board Director.

TfL Response:

The endorsement of the Infrastructure Carbon Review commitments by the Rail and Underground Board in January 2016 is a significant step in mainstreaming carbon reduction. TfL welcomes IIPAG's support and looks forward to strong collaboration in the coming year.

4.12. Non-Permanent Labour

IIPAG has been briefed on TfL's approach to Non-Permanent Labour (NPL), and has examined how the business proposes to deliver suitably skilled personnel, in particular for engineering, for the business. TfL's approach is to use a multi-vendor Framework Agreement, as recommended via a study of options available for recruiting suitable engineering resources.

Given the options considered this appears to be a sensible selection. However, IIPAG is concerned that TfL's approach is tactical rather than strategic. It has addressed the question, "given these criteria and constraints, how should we recruit NPL?", rather than the strategic "what is the best way for TfL to ensure that we have access to the right skills at the right price?".

IIPAG is concerned that TfL has not properly considered what kind of business it wishes to be, for example how much NPL *should* TfL aim to employ in different areas, and that it might lack the basic information to make this decision. IIPAG would expect the process to formulate such a strategy to include:

1. Understanding of future requirements for skills and expertise;
2. Understanding the cost base, for example the total cost of permanent staff, NPL, contractors;
3. Understanding current skills base; and
4. Understanding the market for skills required.

As noted in section 4.10, IIPAG has commented upon the importance of TfL understanding its total and base costs for many years. IIPAG does not believe that TfL has a good understanding of the total costs (including, for example, pensions, accommodation, insurances, other overheads) associated with its current staff and so is not in a good position to make a well informed decision. IIPAG remains of the view that this is fundamentally important for TfL. Without a comprehensive view of staff costs it is not possible for the business to come to a well reasoned and comprehensive view of the most appropriate strategy to resource its Investment Programme.

TfL Response:

Over the last 18 months, TfL has been developing a Strategic Workforce Planning capability that provides an evidence-based and repeatable method for creating workforce resource plans. The impact of changes to the business plan can also be modelled.

By reviewing TfL's workload on a segmental basis (for example engineering across the business rather than in a single area), the skills and resources needed to deliver that workload over a 3-5 year period can be mapped. For the first time, the Strategic Workforce Planning tool provides a central view of acute workforce issues and future skills requirements, informing the strategic resourcing plans for future skills and competence.

The introduction of Workforce Planning allows the business to make informed decisions, both in the short and long-term, on the most appropriate resourcing response to deliver the business need.

Where the business takes a view that Non-Permanent Labour is the most appropriate resourcing response, the new multi-vendor Engineering Recruitment Framework provides a cost-effective way of securing high quality non-permanent Engineering staff. With no minimum level of hiring built into the contract, the framework provides the flexibility to make the right decisions based on the insights from workforce planning to deliver cost-efficient resourcing solutions.

5. ASSET MANAGEMENT & BENCHMARKING

5.1. Introduction

Asset Management is widely recognised as the best approach to managing infrastructure and combines technical, financial and organisational approaches to minimise the “whole life” cost of assets. This includes the costs of acquisition, operation, maintenance, disposal and renewal of physical assets, together with the value of risks such as worse reliability and the resulting impact on the business. Done properly it allows limited financial and human resources to be prioritised optimally to deliver specific service levels at acceptable levels of risk.

Benchmarking is a subset of Asset Management. It allows businesses to understand how their practices, costs and performance relate to comparators elsewhere. Effort can then be prioritised on areas where it seems, based on these comparisons, that it can have maximum impact. In addition, quantitative comparisons enable businesses to demonstrate to what extent their costs and performance are in line with comparators elsewhere.

TfL Response:

Through IIPAG’s guidance, TfL has made considerable strides in developing the maturity of its benchmarking such that it is fully embedded across London Underground (LU) Operations and Capital Programmes, Buses, and Surface Asset Management. It is also becoming progressively embedded across the entirety of Surface Transport. TfL is pleased to note IIPAG’s recognition of the progress made against the majority of its previous recommendations.

5.2. Asset Management

IIPAG has not reviewed London Underground’s plans for 2016/17 and beyond since, at the time of writing, these have not been provided. The development and approval of Asset Management Plans has been delayed by the output of the Comprehensive Spending Review and the Mayoral Election, both of which will have a material effect on the funds available and the priorities for spending.

IIPAG has, however, examined how processes training and competences for Asset Management have developed across TfL. Both London Underground and Surface Transport have had their processes and documentation independently compared to the requirements of ISO 55000, the International Standard for Asset Management. These comparisons have been used to develop plans for improvement. An Asset Management Development Group has been formed to share best practices and approaches across TfL and to develop, where appropriate, common training, systems and processes.

5.3. Benchmarking

IIPAG's Annual Benchmarking Report is attached as Appendix A to this report. This year's benchmarking shows that:

- Once again, Tube reliability and unit operating costs have improved. London Underground's trend of improvement on both of these key metrics is impressive and among the best of all international metros, with consistent and sustained improvements in unit costs over the last 5 years.
- The improvement in unit operating costs is largely due to reductions in administration and other costs. This reduction is due to the integration of Tube Lines. However, administration and other costs remain a larger component of total operating costs than in lower cost metros and seem an area where significant cost reductions might still be possible.
- Improved reliability is largely due to further improvements in equipment reliability. Delays caused by staff, the second largest single cause of delays on London Underground, were unchanged and have now remained roughly constant for almost 3 years. Staff caused delays are among the highest of any international metro.
- Improved access arrangements for stations works has significantly reduced the unit costs of works such as tiling, with unit costs reduced by almost half at the first station to be completed under these changed conditions.
- The unit costs and reliability of London's Buses remains among the best in the world, but there is evidence that works to London's roads are increasing journey times and reducing revenues.

IIPAG makes a total of three recommendations to TfL of areas to prioritise, all of which reiterate previous recommendations. IIPAG:

1. Reiterates its recommendation that TfL increases its focus on London Underground's "admin and other overheads" costs (i) clearly setting out its approach to reducing these costs (ii) setting itself challenging targets for reductions in costs and (iii) tracking and reporting on progress in cost reduction.

TfL Response:

Although LU reduced administration and other overheads unit costs by 11% in 2014/15, TfL accepts that these costs need to reduce further and actions are in place to achieve this reduction. For 2016/17, specialist services budgets have been held at 2015/16 levels and strict headcount controls have been introduced that require all recruitment to be approved by a sub-group of the TfL Executive.

Reliance on expensive agency staff will also be reduced and IT projects delivering limited benefit will be stopped. The Business and Finance Review is assessing all areas of the business to identify where costs may be reduced or income increased.

2. Reiterates its previous recommendation that TfL maintains its focus on delivering the anticipated reductions in train delays caused by staff.

TfL Response:

The 2016/17 plans (incorporating learnings from 2015/16) focus on absence and sickness management, service disruption breaks and reviewing end-to-end trauma management to further improve staff return-to-work. The first two are a main focus on the Circle & Hammersmith (C&H) where the impact has been greatest. Actions include, Line Reliability Plans with a focus on 'staff errors', staff errors meetings to share best practice (especially from C&H experience), on-going monitoring of operator performance (Competence Management) and quicker intervention after 'staff errors', health campaigns to reduce absence, and training to ensure the priorities for ensuring high standards of service are fully understood by both train and station staff.

In addition, the modernisation of signalling through the 4LM programme will reduce delays caused by staff through the elimination of over 200 signals passed at danger per year.

3. Reiterates its previous recommendation that TfL maintains its focus on delivering the anticipated reductions in track maintenance unit rates.

TfL Response:

Track maintenance costs continue to be reduced. A Working Group of senior Asset Managers and engineers is focussing on Track Maintenance Optimisation. Key actions are; accelerating use of risk-based inspection frequencies and passenger train borne remote track monitoring on the Sub-Surface, Bakerloo and Victoria Lines) to reduce on-foot inspection; the latest ultrasonic testing methodology, enabling office-based analysis before committing corrective activities; targeting and accelerating specific renewals and corrective maintenance interventions to reduce inspection frequencies and repeat corrective maintenance; unit rate comparisons to identify best methodologies and drive implementation across all lines; S Stock wheel-rail interface strategy (rail grinding, wheel turning and train-based lubrication) to enhance life-cycle costs and safety; site specific geometry design for plain line tamping; and optimisation of access use to improve delivery efficiency and support Night Tube.

IIPAG has continued to chair TfL's Benchmarking Steering Group, for 2016/17 the key priorities are:

1. To examine how its project overheads compare to those delivered outside of TfL, and set out what steps can be taken should levels differ materially from elsewhere.

TfL Response:

TfL has made significant effort to better understand overhead costs in the last year. The 2016/17 benchmarking programme includes a specific benchmarking study on project overheads.

2. To ensure that its workplan for benchmarking in Surface Transport is delivered, and that tangible improvements resulting from these comparisons are built into its future plans. Resource and expertise should be drawn from TfL's Benchmarking & Value team to assist in this, as appropriate.

TfL Response:

Progress against the Surface benchmarking work plan will be reported regularly to the Surface Board, including achievement of the intended benchmarking impacts as set out in the approved plan, which also identified support required from the B&V team in the form of joint studies with other modes, facilitation of studies through their links with external benchmarking groups and in assisting with setting up the international urban road benchmarking community.

3. To refresh the external comparisons of the costs of Repeatable Work Items for stations works. This will enable London Underground's more recent unit rates, which have taken advantage of longer productive shifts, to be compared with the unit rates delivered both outside TfL and outside the rail industry.

TfL Response:

The RWIs for station works will be reviewed in the context of external comparators and the external comparators refreshed. The opportunity will be taken to see where the comparators could be extended and steps will be taken to obtain external comparator information.

APPENDIX A - IIPAG ANNUAL BENCHMARKING REPORT

1. BACKGROUND

IIPAG's remit includes the direction of Benchmarking across TfL. IIPAG fulfils this via chairing a TfL wide Benchmarking Steering Group, which ensures that the main areas of benchmarking within the various parts of TfL are properly coordinated and aligned and that best practices are shared. TfL's Benchmarking and Value department assists all parts of the business in making sure that teams across TfL have access to suitable expertise. However, individual benchmarking initiatives are generally led and managed within the parts of the business that will be most affected to ensure that the studies are focussed in ways that will deliver best value.

This appendix draws on benchmarking work undertaken by TfL in the last twelve months, together with IIPAG's experience of costs and delivery in project and programme reviews. 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:

- High level comparisons of unit costs and reliability, especially where international comparisons are available; and
- Areas where new work has been undertaken or where ongoing work has highlighted issues that are particularly relevant to TfL's Investment Programme.

Section 2 of the appendix describes IIPAG's view of the main benchmarking findings, and sets out recommendations for TfL.

Section 3 describes progress that has been made in the last year in addressing the areas for business improvement that were highlighted by IIPAG in its 2014/15 report.

Section 4 summarises IIPAG's recommendations to TfL and Section 5 describes IIPAG's proposed focus for benchmarking in the next 12 months.

2. KEY FINDINGS FROM BENCHMARKING THIS YEAR

2.1 Introduction

This section of IIPAG's report sets out key points that IIPAG draws out from benchmarking of:

- International comparisons of Rail and Underground unit costs;
- International comparisons of Rail and Underground reliability;
- Tube capital programme unit costs;
- International comparisons of Bus unit costs and reliability; and
- Surface Transport benchmarking.

IIPAG has highlighted where there are changes in performance or trends and has selected areas where it believes TfL should prioritise action to improve.

2.2 International comparisons of Rail and Underground unit costs

London Underground and the DLR are members of the CoMET and Nova⁴ benchmarking groups, and the international comparisons in this section and the subsequent section on reliability utilise data from 2014, the most recent year for which these comparisons are available.

The high level breakdown of London Underground's operating costs per car km, compared with other international metros, is depicted in Figure 1, below.

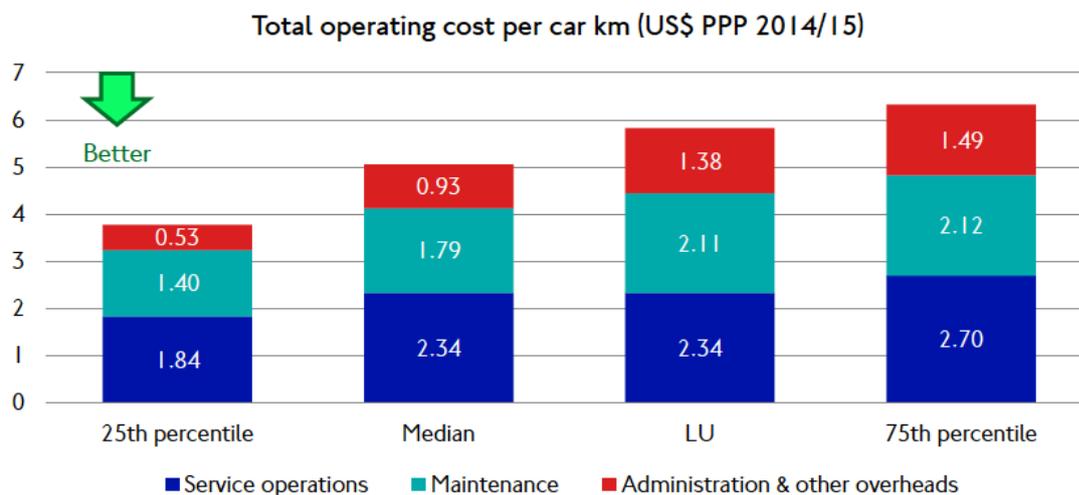


Figure 1: Total Operating Cost per Car km

London Underground's total operating costs per car km remain in the third quartile (i.e. between the median and 75th percentile). London Underground's trend of reduction in this unit cost is among the best in the CoMET and Nova groups, with year on year improvements in each of the last 5 years. The reduction in the last year was due to an increase in car km run rather than a reduction in total operating costs. Service operations unit costs remain at median levels and maintenance unit costs at the 75th percentile, with little change in these comparisons with other metros in the last year⁵.

Administration and Other overheads unit costs have reduced and, where last year they were approximately 2% lower than the 75th percentile metro they are now 7% below this unit cost. Whilst costs in this area remain high they have improved materially in the year. IIPAG understands that this is due, in large part, to the integration of Tube Lines into London Underground. IIPAG considers that, as noted in its last Annual Report, this remains an area where material scope for reduction in costs remains. This is discussed further in section 3, below.

⁴ CoMET is a group of large metros including cities such as New York, Paris and Singapore and Nova contains slightly smaller metros such as Barcelona, Buenos Aires and Kuala Lumpur. Both groups are facilitated by RTSC at Imperial College, London

⁵ The absolute unit costs for these categories have reduced, by 2% and 5% for service operations and maintenance, respectively, but the performance of other metros with comparable unit costs has improved by a similar amount.

2.3 International comparisons of Rail and Underground reliability

London Underground’s reliability, measured on the internationally comparable metric of the number of five minute delays per million car km, continues to improve and is 38% better than in 2009/10. Improvement is broadly based and is apparent across all of the five high level categories into which delays are divided in the last 5 years, as shown in Figure 4, below.

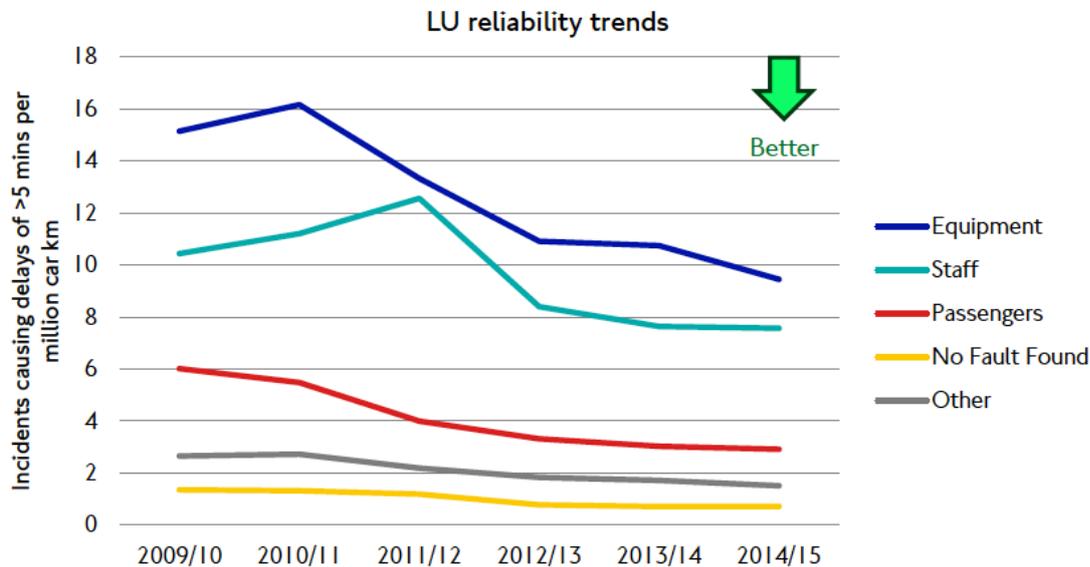


Figure 2: Number of Incidents causing a 5 minute delay per million car km

Unfortunately the rapid reduction in staff delays reported in previous years has not continued and these delays have continued at similar levels to those reported previously. Whilst London Underground’s overall improvements, particularly for equipment reliability, result in overall reliability at better than the median level of North American and European metros, (see Figure 5, below) delays caused by staff remain among the worst of any major metro.

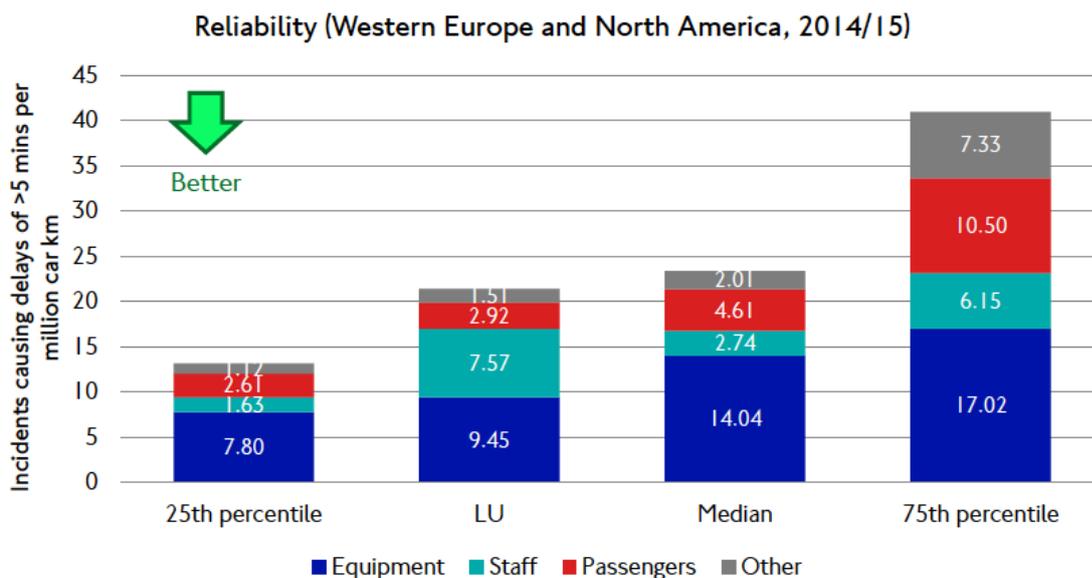


Figure 5: Incidents causing a five-minute delay per million car km

2.4 Tube Capital Programme Unit Costs

Stations Improvements

In the last year there has been a significant change in the approach to access for stations capital works on the Tube network. London Underground has an Integrated Stations Programme to carry out various upgrade works on 26 stations. It was originally intended that this work be undertaken in Engineering Hours, resulting in a typical productive working window of 3 hours and 40 minutes. Access to these stations has been considered on a station by station basis to look for areas where Extended Engineering Hours working could be applied, resulting in around 5 hours and 45 minutes of productive time in a shift. Typically 40% of shifts have been amended to this longer length, with up to 90% possible on some stations. This has resulted in a forecast cost saving of nearly £24m, around 13% of the programme cost.

The application of these Extended Engineering hours, and their impact on unit costs, is being carefully tracked to ensure that it can deliver the forecast savings. Weekly updates on the amount of Extended Engineering Hours are tracked and compared to forecasts with plans put in place to address issues. To date, out-turn costs for this programme are available only for a single station but outcomes appear very positive in terms of unit costs. For example, out-turn labour unit rates per square metre of wall tiling were 49% lower than those forecast for Engineering Hours access only, with floor tiling unit labour rates 44% lower than if access were only in Engineering Hours.

IIPAG commends this work, which appears to be demonstrating the significant impact that changes to access assumptions, arrangements and processes can have on costs.

Track Renewal

London Underground now separately reports its costs of Ballasted Track Renewals (BTRs) for weekend closures (differentiated into simple open line sections, those with restricted access, for example around stations, and those in subsurface area) and the unit costs of overnight BTRs. Whilst unit costs have reduced in the past 5 years there is some indication that unit costs are now rising as shorter and more complex work sites are being renewed.

London Underground is now in the process of procuring new Track Plant equipment that should materially reduce the costs of its track capital works. These forecast cost reductions also allow London Underground to move away from its historical emphasis on BTRs toward re-ballasting of the track, which should materially reduce the whole life costs of track whilst maintaining quality. This will bring London Underground's approach to ballasted track more into line with that used internationally.

Project Overheads

As noted in Section 4.10 of the main report, TfL has examined how central costs might be allocated to projects within London Underground. IIPAG considers that this could be a fruitful area to examine and expects this to be an area where the business focuses its benchmarking efforts in the next year.

2.6 International comparisons of Bus unit costs and reliability

Costs and reliability remain better than median for all main measures and top quartile for many. The number of bus km not run for reasons other than congestion roughly doubled in 2014, the most recent year for which international comparisons are available, due to a strike by bus drivers. IIPAG understands that this measure returned to its previous level, indicating reliability among the best in the world, in 2015.

There has been a noticeable reduction in patronage, and hence revenue, and analysis of where these reductions have taken place indicates that they are likely to be due to significant works causing congestion in certain areas. For example, patronage around Elephant & Castle has dropped by over 7%.

It is clear that Surface Transport is now using its contacts with other international bus networks to improve its services further. It has taken part in a study on bus fare evasion, which indicated that London spent higher sums than most networks on tackling fare evasion but had the lowest levels of evasion of any network. In addition, the number of questions that it is asking of its peers, and answering, have increased significantly and London Buses is playing a leading role in understanding the measures that other cities take to improve priority for buses on roads.

It is important that this work is taken forward and results in tangible actions to improve London's bus service even further.

2.7 Surface Transport Benchmarking

The main step forward in Surface Transport, other than the continuation of international comparisons for buses and work to assess the maturity of Project Management and Asset Management processes, was the adoption of the Cost & Estimating system developed in London Underground. Project cost data is now captured in a common format and structured such that costs can be compared and better estimates built up. This is a significant step and has resulted in a TfL-wide approach to capturing cost data, which should result in improved estimates across the business.

Surface Transport has now had a benchmarking strategy, endorsed by its Board, for 18 months. Its delivery of elements of its workplan over the last year has been mixed and it has worked hard, alongside TfL's Benchmarking & Value team, to ensure that its workplan for 2016/17 is better focussed. In the longer term more and better external comparisons will be developed via an international benchmarking community for roads costs.

IIPAG agrees that these are appropriate steps, and will work with TfL to help identify tangible improvements identified via benchmarking that might be used to improve service delivery and cost efficiency.

3. PROGRESS ON PREVIOUS RECOMMENDATIONS

In its 2014/15 Annual Report IIPAG recommended four new actions for TfL. Progress on these is summarised below:

IIPAG recommends that TfL increases its focus on London Underground's "admin and other overheads" costs (i) clearly setting out its approach to reducing these costs (ii) setting itself challenging targets for reductions in costs and (iii) tracking and reporting on progress in cost reduction.

As noted above, London Underground's "admin and other overheads" unit costs have reduced, due mainly to the integration of Tube Lines into TfL. Many of these costs are incurred at TfL level and attributed to London Underground. TfL has increased its focus on these costs in 2015/16 comparing many of the sub-categories of this cost with those experienced elsewhere as part of its Business and Finance Review. IIPAG looks forward to seeing TfL's plans to reduce these costs.

IIPAG reiterates its recommendation that TfL should increase its focus on "admin and other overheads" unit costs (i) clearly setting out its approach to reducing these costs (ii) setting itself challenging targets for reductions in costs and (iii) tracking and reporting on progress in cost reduction.

IIPAG recommends that a comparison of actual and expected unit costs and the frontier shift of unit costs delivered by international metros be explicitly set out in London Underground's Asset Management Plans.

Comparisons of actual and forecast unit costs with international comparators are now to be included in London Underground's Asset Management Plans.

IIPAG recommends that TfL undertake a detailed comparison of the maintenance approaches used on the Jubilee Line and those employed on the Victoria and Subsurface Lines.

TfL has held three rolling stock maintenance workshops to bring together key people from the business. It was found that contracts with Bombardier for technical support and spares consist more than a quarter of the maintenance costs for the new Victoria Line and subsurface fleets, and this was by far the largest differential in unit costs. Further details around the complexity of maintaining sensitive door edges on the new fleets and lower staff costs on the Jubilee Line drive higher unit costs.

IIPAG recommends that TfL carefully consider the value for money of the Amey contract, taking into account the likely long term improvements in efficiency that such an internal comparator might deliver.

London Underground is currently considering whether the proposal submitted by Amey for the contract to continue beyond its break point offers best value for money and comparing this to an in house provision with or without a new delivery partner.

IIPAG also reiterated five previous recommendations, that:

1. *TfL maintains its focus on delivering the anticipated reductions in track maintenance unit rates; The Automatic Track Monitoring System (ATMS) has now been rolled out to the subsurface lines, and this will allow patrolling of track to be halved. However, the introduction of ATMS has not reduced corrective maintenance volumes, since increased loads are increasing the number of incidences of rolling contact fatigue (RCF). RCF is not detected by ATMS. London Underground now grinds its track to maintain rail profile more than*

previously and this should improve future unit costs, though it is currently unclear the extent to which this will reduce rail unit costs or fleet unit costs. Whilst IIPAG agrees that these are all important moves London Underground's relatively high track maintenance unit costs indicate that reducing these should remain a priority for London Underground.

2. *TfL maintains its focus on delivering the anticipated reductions in train delays caused by staff*; As noted above, progress on reductions in delays due to staff has slowed greatly in the last two years. Delays caused by staff remain among the highest of any major metro. It is clear that improvement on this measure could deliver a material improvement of the reliability of London Underground and IIPAG considers that this recommendation remains important.
3. *TfL maintains its focus on delivering the anticipated reductions in track renewals unit rate*; Progress in this area is noted in section 2.4, above. IIPAG considers that this recommendation is best tracked via its involvement in Integrated Assurance Reviews of the Track Renewals and Track Plant Programmes
4. *Costs of delivering RWIs be consistently and regularly reported to the business, for example via Annual Independent Assurance Reviews (IARs)*; IIPAG considers that this recommendation is best addressed via its involvement in IARs.
5. *RWI unit rates are carefully tracked to ensure that anticipated changes in unit rates due to changes in access are delivered*; IIPAG considers that this recommendation is best addressed via its involvement in IARs.

4. SUMMARY OF RECOMMENDATIONS

IIPAG has made a total of three recommendations to TfL of areas to prioritise, all of which reiterate previous recommendations. IIPAG reiterates its recommendations that:

1. TfL increases its focus on London Underground's "admin and other overheads" costs (i) clearly setting out its approach to reducing these costs (ii) setting itself challenging targets for reductions in costs and (iii) tracking and reporting on progress in cost reduction.
2. TfL maintains its focus on delivering the anticipated reductions in train delays caused by staff.
3. TfL maintains its focus on delivering the anticipated reductions in track maintenance unit rates.

5. FOCUS OF BENCHMARKING IN 2016/17

IIPAG considers that the main focus of benchmarking in the next year should be to assist in addressing the first two recommendations noted above.

In addition:

1. TfL should examine how its project overheads compare to those delivered outside of TfL, and set out what steps can be taken should levels differ materially from elsewhere.
2. TfL should ensure that its work-plan for benchmarking in Surface Transport is delivered, and that tangible improvements resulting from these comparisons are built into its future plans. Resource and expertise should be drawn from TfL's Benchmarking & Value team to assist in this, as appropriate.
3. Comparisons of the costs of Repeatable Work Items for stations works on London Underground with external comparators should be refreshed. This will enable London Underground's more recent unit rates, which have taken advantage of longer productive shifts, to be compared with the unit rates delivered both outside TfL and outside the rail industry.