

Board



Date: 30 January 2019

Item: Crossrail Update – KPMG reports addendum

This paper was issued to Members and published with less than five clear working days' public notice in accordance with Standing Order 33. The paper contains supplemental information to the item elsewhere on the agenda on the Crossrail Update. In accordance with Section 100B(4)(b) of the Local Government Act 1972, the Chair has agreed that this additional information can be considered as a late item as it addresses information in two reports by KPMG that were published after the papers for this meeting of the Board were published.

This paper will be considered in public.

1 Summary

- 1.1 Further to the Crossrail Update item on the agenda, this paper provides an overview of the findings and recommendations of the KPMG independent reviews into Crossrail Limited's governance and commercial/financial arrangements.

2 Recommendation

- 2.1 **The Board is asked to note this paper.**

3 KPMG independent reviews

- 3.1 The Mayor asked TfL, on behalf of the joint sponsors (Department for Transport (DfT) and TfL), to commission independent reviews into Crossrail Limited's governance and commercial/financial arrangements. These reviews were undertaken by KPMG to ensure the right scrutiny and oversight are in place as the project enters its critical next phase, and that Crossrail Limited's financial and schedule projections are robust. The reviews have been completed and have been published on our website (<https://tfl.gov.uk/corporate/publications-and-reports/crossrail-project-updates>). The Executive Summaries of the reports are included as appendices to this paper.
- 3.2 KPMG identified some key points in regards to the opening of the central section of the Elizabeth line, including:
 - (a) performance monitoring and reporting has not led to adequate advance notice being provided of the need to revise the opening date and the resulting material cost impact;

- (b) the Crossrail Limited Board reports provide lots of information and data but do not provide sufficient critical analysis to enable the realistic achievability of the opening date to be fully understood;
 - (c) the Project Representative reported many of the key issues and risks to the achievement of the opening date but did not provide an assessment of the potential/likely impact on the opening date; and
 - (d) both the Crossrail Limited Board and executive pursued a demobilisation plan of central resources around a December 2018 opening, which led to a reduced level of oversight in the critical areas of finance and commercial performance, risk and reporting around commercial and financial risks.
- 3.3 Based on the findings of the governance review, KPMG recommends changes to the governance of the Crossrail Project to align the structure with the programme requirements through to completion and to facilitate Sponsors to achieve more effective oversight.
- 3.4 For the commercial/financial review, KPMG assessed 13 significant contracts through six scenarios of date and run-rate assumptions and has considered the impact of indirect costs given the prolongation of the programme. The findings indicate the likely capital cost impact of the delay to the project, announced in August 2018, could be in the region of between £1.6bn and £2bn. KPMG notes that the schedule requires significant work before the capital cost impact of the delay can be considered robust and recommends that Crossrail Limited's financial and commercial organisation and processes need re-establishing to give control over the costs.
- 3.5 The findings and recommendations presented in KPMG's reports reflect fieldwork which concluded on 7 December 2018 and the report does not reflect information released or changes to the Crossrail Limited Board and executive after this date. In particular, the Crossrail Limited Board has approved the appointment of Tony Meggs as Chair and Nick Raynsford as Deputy Chair who took up their roles on 14 January 2019. Tony Meggs, who has stepped down from his role as CEO of the Infrastructure and Projects Authority (IPA), will bring a wealth of experience from his role at the IPA as well as a long career in leadership positions in the private sector. Nick Raynsford is a former MP and served as Minister for London on two occasions between 1997 and 2003.
- 3.6 Sponsors are considering the recommendations of the reviews and are working with Crossrail Limited to develop a prioritised action plan. A number of actions have already been taken to strengthen the governance and assurance on the project. These actions include changes to the composition of both the Crossrail Limited Board, as noted above and the executive team and strengthening the Project Representative. The new Crossrail Limited executive is also implementing plans to enhance the Crossrail organisation in the areas of financial control, commercial control and system integration.
- 3.7 To consider the wider applications of these recommendations, we will also look at how the lessons from the Crossrail Project can apply to how we manage and take projects forward as part of our investment portfolio.

List of Appendices:

Appendix 1: KPMG Governance Report: Executive Summary

Appendix 2: KPMG Commercial/Financial Report: Executive Summary

List of Background Papers:

None.

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Independent review of Crossrail - Governance

Prepared for TfL and DfT

23 January 2019

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Glossary

AFDCD	Anticipated Final CRL Direct Cost
AFC	Anticipated Final Cost
ARM	Active Risk Management
BRS	Business Rate Supplement
CBTC	Communications Based Train Control
CCR	Cost Consideration Report
CCSA	Contract Commercial Status Analysis
CCSC	Commercial and Change Sub-Committee
CD	Commercial Director
CEO	Chief Executive Officer
CFO	Chief Finance Officer
CMS	Central Management System
COS	Central Operating Section
COWD	Cost of Works Done
CRL	Crossrail Limited
DfT	Department for Transport
DOO	Driver Only Operation
EIC	Executive and Investment Committee
ELRB	Elizabeth line Readiness Board
ELSSG	Elizabeth line Strategic Steering Group



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FD	Finance Director
FLU	Full Length Unit
FRC	Financial Reporting Council
GLA	Greater London Authority
H&S	Health & Safety
HMG	Her Majesty's Government
HMT	Her Majesty's Treasury
IAAP	Integrated Assurance and Approval Plan
IA	Internal Audit
ICE	Institution of Civil Engineers
IM	Infrastructure Manager
IP	Intervention Point
IPA	Infrastructure and Projects Authority
JST	Joint Sponsor Team
KPI	Key Performance Indicator
LUL	London Underground Limited
MD	Managing Director
MCIL	Mayoral Community Infrastructure Levy
MTR	MTR Corporation (Crossrail) Limited
MOHS	Master Operational Handover Schedule
NAO	National Audit Office
NEC	New Engineering Contract



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NED	Non-Executive Director
NR	Network Rail
ONW	On Network Works
ODA	Olympic Delivery Authority
OSEP	Operations and Systems Expert Panel
PAC	Public Accounts Committee
PCD	Programme Controls Director
PDA	Project Development Agreement
PDB	Programme Delivery Board
PM	CRL Project Manager
P Rep	Project Representative
QCRA	Quantitative Cost Risk Analysis
QRA	Quantified Risk Assessment
RAP	Remedial Action Plan
RemCo	Remuneration Committee
RfL	Rail for London
RfLI	Rail for London Infrastructure
RLU	Reduced Length Unit
SA	Sponsor Agreement
SACR	Semi Annual Construction Report
SB	Sponsor Board
SC	Staged Completion



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SoS	Secretary of State
SQRA	Schedule Quantified Risk Assessment
TCR	Tottenham Court Road Station
TEV	True Expected Value
TfL	Transport for London
TOSD	Tier One Contractor Substantial Demobilisation
tph	Trains per hour
URT	Unresolved trends



1 Executive summary

1.1 Introduction

1.1.1 Background

At the end of August 2018 Crossrail Limited (CRL) announced that the opening of Stage 3, the Central Operating Section (COS), of the Crossrail project (the project) would be delayed from December 2018 to Autumn 2019. An Adverse Event Notice, in accordance with clause 22 of the Project Development Agreement (PDA), was issued to Sponsors on 30 August 2018.

Transport for London (TfL), a joint sponsor with the Department for Transport (DfT), appointed KPMG on behalf of both Sponsors in late September 2018 to carry out two independent reviews of the Project.

Prior to the appointment of KPMG and after receipt of the Adverse Event Notice, the Sponsors requested CRL to prepare a Remedial Action Plan (RAP 1). It was issued on 18 September 2018 and was followed by an update (RAP 2) on 2 October 2018. RAP 1 and RAP 2 are jointly referred to as the 'RAP' in this report.

KPMG was asked by Sponsors to review RAP 1 shortly after it was released in September 2018. That review was guided by the separate financial and commercial Terms of Reference provided by the Sponsors to assess the reliability and robustness of the revised schedule and cost put forward by CRL. RAP 2 was issued during the course of our assessment and extended the scope of our review to include RAP 2. For the purposes of this governance report we have had regard to the RAP documents in addressing the Terms of Reference requirements in relation to commercial reporting, oversight, and commercial controls.

CRL was also at the time of our fieldwork updating its Master Operational Handover Schedule (MOHS) that was due to be issued in October 2018. However, at the time of finalising our fieldwork in December 2018 the updated MOHS had not been issued and our fieldwork does not take into consideration any time or cost information other than that contained within the RAP documents except where expressly stated in this report.

1.1.2 Scope of KPMG's work

The scope of our reviews were separately defined in two sets of Terms of Reference:

- Financial and commercial independent review;
- Governance independent review.

This draft report addresses the governance Terms of Reference (which are set out at Appendix 1). Our financial and commercial review is covered in a separate report.

1.1.3 This report

This report has considered the particular governance implications arising from the current stressed¹ status of the Crossrail project, and from the uncertain project cost and completion timelines. The scope of work we were asked to address in our review of governance, is attached as Appendix 1. It is important to note the scope requires that this *“review should focus on current effectiveness and scope for improvement for the remainder of the project while also considering the historical context that has*

¹ “Stressed” in terms of the project having needed on 10 December 2018 to significantly change expectations as to outturn timeline for Stage 3 Opening and as to cost, and the related significant uncertainties and related challenges which remain to be addressed

led to the need for this review'. In addressing historical context we were guided to have regard to the preceding 12 months.

Accordingly this report does not seek to review the operation of CRL or its governance in earlier years. We note the many reported achievements of the Crossrail project in its journey and inter alia the Crossrail Learning Legacy it has shared.

An important objective of this report is to help Sponsors to identify the governance and other steps required to be taken at pace to enable CRL to move forward strongly from the current stressed status of the project to help it to achieve its objectives with a particular emphasis on completion time and cost.

The findings and recommendations presented in this report reflect fieldwork which concluded on Friday 7 December 2018. The report has not been updated for new information released after this date save for making reference to TfL's press statement issued on the morning of 10 December 2018.

This report and the recommendations contained within it have been drafted in line with the direction of the Terms of Reference, the focus being on identifying improvements to governance arrangements to address the specific challenges now facing the Crossrail project. Revisions to the governance structure for the Crossrail project have to take into account historical issues but must also in particular, be designed to meet the needs of the remaining programme of work. Governance arrangements should be designed to provide Sponsors and stakeholders with confidence that CRL will complete the project within the newly defined affordability envelope as well as within revised timelines which are still subject to development by CRL and, agreement with Sponsors. CRL will also need to agree with Sponsors that updated frameworks of control and oversight are in place and operating effectively. These same arrangements must also provide CRL as the organisation responsible for the delivery of Crossrail, with the freedoms necessary to address programme delivery issues, manage timely and cost effective delivery to completion, and manage complex integration challenges.

The programme performance issues and the recent announcements of programme cost overruns and delays mean that trust and confidence between Sponsors and CRL has been weakened. Revised governance structures should work alongside action already taken by Sponsors and CRL to enhance CRL management and to help rebuild trust. Transparency and open communication between Sponsors and CRL will be critical in underpinning the structural recommendations both in this report and in our separate report addressing the financial and commercial Terms of Reference.

Action to address the recommendations contained in this report, and in the financial and commercial report, is required as soon as possible so that the revised arrangements are in place and operating to support Sponsors, the CRL Board and CRL Executive team. The project outturn cost which will actually be achieved critically depends on:

- The extent to which appropriate steps are rapidly taken by Sponsors and CRL to address the issues covered in this report, and in the related financial and commercial report, which are the basis for our recommendations provided to Sponsors for consideration; and
- Whether additional significant risks materialise which have a material impact and which have not already been identified by CRL within its RAP 2 document.

1.2 Crossrail programme – history and context

The Crossrail Act 2008 permitted the construction of the Crossrail railway from Maidenhead and Heathrow in the west to Shenfield and Abbey Wood in the east, with new rail tunnels (and stations) under central London as required. The funding deal for the scheme was complex but the basic principle was simple – the cost would be shared between the Government, TfL and the business community.

Crossrail broke ground on 15 May 2009 at Canary Wharf, when the Mayor and the Transport Secretary launched the first pile into the North Dock in Docklands at the site of the new Canary Wharf station.

In 2010, the Government's Comprehensive Spending Review confirmed savings of over £1bn in projected Crossrail costs. This was reported as due chiefly to a revision of the tunnelling strategy² and due to "improved station and engineering solutions and a more efficient construction timetable"³. This meant that Crossrail services would commence through the COS in 2018 rather than 2017, followed by a phased introduction of services across the rest of the route, but it also allowed the funding envelope needed to deliver Crossrail to be reduced to £14.8⁴bn from £15.9bn.

Crossrail tunnelling began in May 2012 and ended in May 2015. As noted above, we have not been asked to review the overall Crossrail project and its many achievements. For context we note from Crossrail's own website⁵ that it summarises the project as follows:

"Crossrail is among the most significant infrastructure projects ever undertaken in the UK. From improving journey times across London, to easing congestion and offering better connections, Elizabeth line will change the way people travel around the capital."

It also notes the following general information:

- **"Crossrail Limited is building the Elizabeth line - a new railway for London and the South East, running from Reading and Heathrow in the west, through 42km of new tunnels under London to Shenfield and Abbey Wood in the east.**
- **The Crossrail project is currently Europe's largest infrastructure project.**
- **The new railway, which will be known as the Elizabeth line when services begin through central London, will be fully integrated with London's existing transport network and will be operated by Transport for London.**
- **The Elizabeth line will stretch more than 60 miles / over 100km from Reading and Heathrow in the west through central tunnels across to Shenfield and Abbey Wood in the east.**
- **An estimated 200 million annual passengers will use Crossrail.**
- **The Elizabeth line will serve 41 stations including 10 new stations at Paddington, Bond Street, Tottenham Court Road, Farringdon, Liverpool Street, Whitechapel, Canary Wharf, Custom House, Woolwich and Abbey Wood.**
- **Construction of the new railway will support regeneration across the capital and add an estimated £42bn to the economy of the UK.**
- **Over 130 million working hours have been completed on the Crossrail project so far."**

We note that CRL management has highlighted to us "the many years of successful delivery, the completion of the largest ever tunnelling works, station civil works, [and] implementation of much of the highly complex track, including floating track slab works, through the centre of London with very little disruption".

The project has been subject to reviews and independent scrutiny. One such example was a July 2014 Public Accounts Committee (PAC) report. The PAC July 2014 report noted "The Crossrail programme is proceeding well and is on course to deliver value for money to the taxpayer. The joint sponsors of the Crossrail programme, the Department for Transport (the Department) and Transport for London, are working well with the delivery organisation, Crossrail Limited, to deliver the programme, which at present is broadly on schedule and being delivered within budget". This report however cautioned that "construction is not yet complete, and considerable risks remain in delivering

² <http://www.crossrail.co.uk/route/crossrail-from-its-early-beginnings>

³ Crossrail Limited: Programme Overview Report, December 2010

⁴ Including NR ONW and Depot costs

⁵ Elements of this sub-section are drawn from the contents of the CRL website as at December 2018

the programme by 2019, particularly managing the transition from building the railway to operating it, and delivering the Crossrail trains”.

In the same year a National Audit Office (NAO) report noted that *“During the construction phase, the governance arrangements and oversight of the project have ensured tight management of the programme so that delivery to both cost and schedule are well managed.”*

The NAO 2014 report also noted a need to consider the future transition from construction to operations. It recommended that *“the Department [DfT] now needs to [f]inalise its plans for the development of governance arrangements as appropriate for the transition from construction to operations, over the next five years. The Department should work with Transport for London, Crossrail Limited and Network Rail to produce a transition plan of similar clarity to the founding programme agreements.”*

During interviews for this report the DfT noted that following the NAO recommendations, action⁶ had been taken to consider the future governance arrangements required for the transition from construction to operations.

This report has considered the particular governance implications arising from the departure from “business as usual” to the current stressed status of the Crossrail project, including from the uncertain project cost and completion timelines.

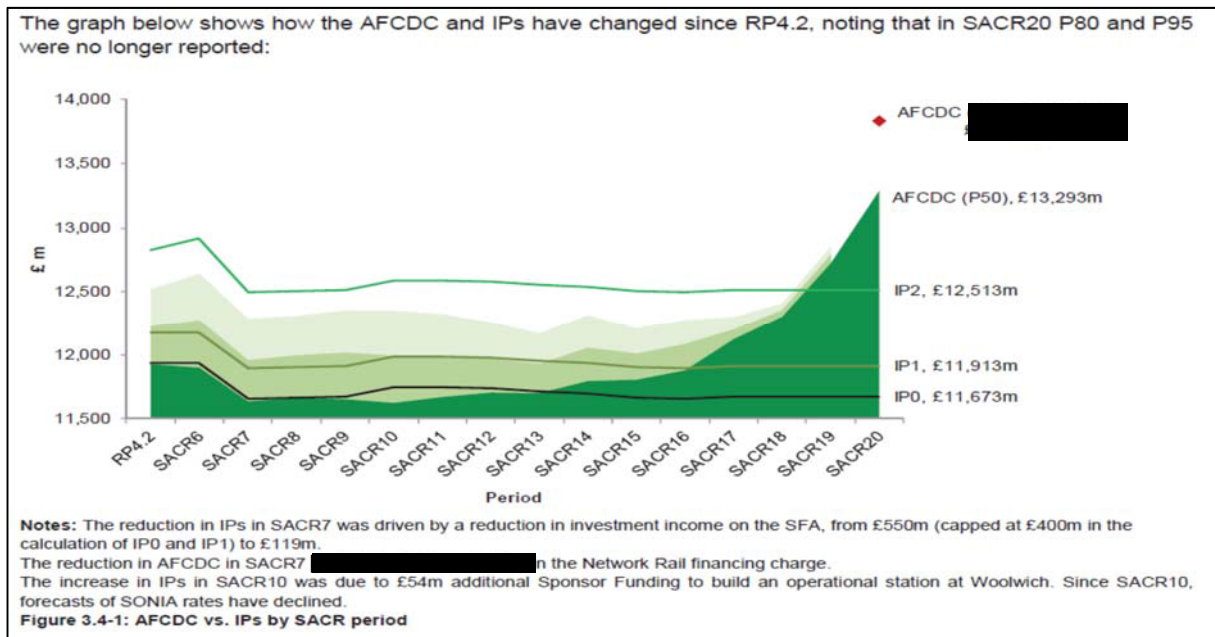
With regard to forecast outturn cost, we note that CRL’s recent 6 monthly Semi-Annual Construction Report (SACR) 20⁷ report summarises the Anticipated Final CRL Direct Costs (AFCDC) as reported over the last 7 years or so. We note that total Crossrail Project costs (which had an affordability envelope of £14.8bn) comprise in addition to AFCDC, the Network Rail (NR) On Network Works (ONW) costs and Depot costs. In relation to Commercial matters this report addresses AFCDC and not total Crossrail project costs. With regard to governance matters, this report addresses CRL’s integration and direct delivery responsibilities and related governance matters.

The reported AFCDC over the last 7 years or so, is set out in the graph at Figure 1 culminating in the recent increase in AFCDC referred to under section 1.3. The graph shows the reported AFCDC in each SACR report (these are produced 6 monthly). The dark green area represents what was reported as P50, and the lighter greens, P80 and P95 which have converged as the project has progressed. One can see significant increases in reported P50 AFCDC after SACR 16, and in reported P95 AFCDC after SACR 18, based on the graph.

⁶ It was not part of our Terms of Reference to review actions taken in response to the NAO 2014 report and we have not sought to do so.

⁷ SACR 20 covers the period from 1 April to 15 September 2018

Figure 1: Crossrail - Change in AFDCD and Intervention Points (IPs) since RP4.2 in May 2011



Source: SACR 20

Note: Each SACR covers a 6 month period ending March or September with SACR 20 being the period 1 April to 15 September 2018. The P50 number of £13,293m shown in the above graph (as extracted from SACR 20) was the AFDCD P50 value reported by CRL in its Period 06 Board Report. SACR 20 used the P95 [redacted] value of £13,831m, as agreed with Sponsors as the AFDCD for the purposes of SACR 20. This reflected the latest information available through RAP2.

1.3 Recently announced outturn cost and funding

CRL has recently announced a significant increase in cost to completion and the delayed opening of the Elizabeth line. To complete the project, there remains significant work to be performed, in particular the completion of the stations, train testing, systems integration and transition to operations. At the time we were completing our fieldwork, CRL was developing a revised MOHS and estimated cost to completion.

On 26 October 2018, the Government announced, as an interim measure, that £350 million of short term repayable financing would be made available to the Mayor for the year 2018_19. The purpose was to “ensure that full momentum is maintained behind Crossrail”.

On 10 December 2018 TfL issued a press release which stated inter alia:

“The emerging findings of the KPMG review into Crossrail Ltd’s finances indicate the likely capital cost impact of the delay to the project announced in August could be in the region of between £1.6bn and £2bn⁸. That includes the £300m already contributed by the Department for Transport (DfT) and TfL in July 2018, leaving an estimated £1.3bn to £1.7bn to complete the project.

The Mayor of London and the Government have agreed a financial package to cover this. The Greater London Authority (GLA) will borrow up to £1.3bn from the DfT. The GLA will repay this loan from the existing Business Rate Supplement (BRS) and Mayoral Community Infrastructure Levy (MCIL). The GLA will also provide a £100m cash contribution, taking its total contribution to £1.4bn which it will provide as a grant to TfL for the Crossrail project.

⁸ This equates to a forecast outturn AFDCD of £14.1bn to £14.5bn respectively, as compared with a budget of £12.5bn.

Because the final costs of the Crossrail project are yet to be confirmed, a contingency arrangement has also been agreed between TfL and the Government. This will be in the form of a loan facility from the DfT of up to £750m, should the higher end of the estimate be realised.

This combined financing deal will replace the need for the £350 million interim financing package offered by the Government in October.”

1.4 Governance context

The overarching Crossrail governance structure, being the arrangements established between Sponsors and CRL as the delivery body, largely reflects the design of arrangements which were put in place during the early stages of the project. The Sponsors' roles and responsibilities are defined in the Project Documentation, in particular in the Sponsors Agreement (SA), PDA⁹ and specifically as regards TfL as the owner of CRL, in TfL's Shareholders Agreement.

The SA notes that “[the] SoS and TfL have agreed that the overall management of the Crossrail Project and their relationship as its co-sponsors shall be governed by the terms of this Agreement” and the agreement provides additional detail regarding the responsibilities of the parties. In April 2011 Review Point 4 was completed, this review point involved the assessment of both Sponsors and CRL by the Major Projects Review Group and considered the projects readiness to move to the next phase (for example tendering for delivery works contracts). The completion of Review Point 4 signalled the point at which CRL met requirements as defined in the PDA for the transition of decision making authority from the Sponsors to CRL. The PDA did not specify additional review points and the governance structure between Sponsors and CRL has not significantly evolved since the completion of Review Point 4.

This report recommends changes to governance to reflect the stressed status of the project, to align the structure with the now changed current and expected project requirements through to completion, and to facilitate Sponsors to achieve / sustain more effective oversight. Given the stage and complexity of the remaining programme, a completely new governance structure is not considered appropriate as it would potentially introduce significant risk to the project.

Changes have already been implemented with regard to CRL leadership. The Chair of the CRL Board has resigned, a replacement is being sought, and there is a new Executive management team in place within CRL. The new Chief Executive Officer (CEO) and Finance Director (FD)¹⁰, are both TfL secondees, appointed at the behest of Sponsors.

1.5 Principles and report assumptions

A set of principles guided the development of the recommendations in this report. The principles are derived from the assessment of the current project status, the current operation of the governance structure and the specific requirements of the forward programme. As such the recommendations in this document should do the following:

- Reflect the stressed status¹¹ of the project;
- Support the rebuilding of trust between Sponsors, CRL Board and CRL Executive;
- Deal with any identified deficiencies in the current governance arrangements in the context of the situation in which the programme now finds itself;
- Support increased transparency at all levels of the programme;
- Be forward looking, aimed at supporting the project through to completion;

⁹ The PDA and SA were agreed in 2008.

¹⁰ We have used FD to refer to the role of Finance Director previously held by Mathew Duncan but note that David Hendry appointed with similar responsibilities holds the title of CFO. We have used the term 'FD' to refer to either the previous FD role or the new CFO role.

¹¹ “Stressed” in terms of having needed on 10 December 2018 to significantly change expectations as to outturn timeline for Stage 3 Opening and as to cost, and the related significant uncertainties and related challenges which remain to be addressed.

- Be proportionate and practicable. Recommendations must be capable of implementation within timeframes that have a practical and timely effect on the project; and
- Maintain clarity and separation of Sponsor and CRL roles.

The following assumptions informed the recommendations contained in this report:

- Sponsors will agree additional funding facilities sufficient to cover the expected costs of the effective execution of the balance of the programme, together with appropriate mechanisms for bearing risk and holding contingency
- Neither Sponsor has, nor will choose to exercise its “Put” and “Call” rights at this stage
- Sponsors will remain jointly accountable for the overall programme. The joint Sponsor Board (SB) will continue. Sponsors will not assume formal delivery responsibility
- CRL will remain the responsible body for the completion of the project in line with the responsibilities articulated in the PDA, this includes management and integration of the whole programme to deliver an operational railway. The CRL Board will continue, but with potential revisions in composition and autonomy
- Sponsors have confirmed that the CRL Board and Executive team will be given the opportunity and responsibility to address the current issues and deliver the remaining programme

1.6 Our overall approach

Our overall approach to addressing the governance Terms of Reference was to review documentation provided by CRL and TfL, and hold interviews with certain senior Sponsor and CRL staff, as well as with others as appropriate. It was not part of our Terms of Reference to seek information direct from Contractors.

Our overall findings and critical recommendations are summarised at Section 1.7 below followed by our observations and recommendations on moving forwards at Section 1.8. An introduction and additional information on our approach is contained at Sections 2 and 3 respectively. Our detailed findings and the full detail of all our recommendations are set out in the supporting Sections 4 to 8 and in the appendices. For a full understanding of the matters considered the reader should consult the relevant sections and appendices as appropriate.

1.7 Overview of key findings and critical recommendations

1.7.1 General points

Our findings as previously noted, are drawn from a review of documents and information provided which principally relates to the 12 months up to our fieldwork. In this Executive Summary we have set out an overview of key findings together with critical recommendations. After each critical recommendation we have included the recommendation number in brackets so that the reader can consult the detailed recommendation in Sections 4 to 8 where, in many cases, there is significant additional detail as well as further recommendations, sometimes related.

The drafting of a detailed recommendation means that we have concluded a change is required either because Crossrail’s needs have changed given the project is no longer in a “business as usual” state, or because we found evidence / examples that an important control or process was missing or was not designed and / or operating in line with good practice. The inclusion of a finding / recommendation does not therefore mean that the area has not been operating appropriately throughout the entire Crossrail programme, but it does mean that a change / improvement is now, in our view, needed.

1.7.2 Programme sponsorship

There is a need, consistent with our recommendations, to enhance Sponsor oversight of the programme. The recommendations reflect the fact that the project is now stressed and no longer in a “business as usual” state. They have also been informed by good practice and examples from other major government programmes.

Particular areas of focus for Crossrail include maintaining the separation between Sponsors and CRL, whilst increasing Sponsor oversight and controls, rebuilding the trust between Sponsors and CRL and enhancing the behaviours which underpin transparency. This critically needs to be supported by mechanisms which enable enhanced reporting at all levels (by contractors to CRL, within CRL, and by CRL to Sponsors), as well as sufficient assurance of the information provided.

Critical recommendations include:

- Sponsors to encourage and ensure the fostering of an enhanced culture and environment within CRL whereby relevant performance information and risks are encouraged to be openly and promptly shared throughout the organisation so as to best enable informed timely decision-making (4.2);
- Sponsors to foster a culture and environment where CRL is encouraged to share relevant performance information, especially when programme performance and / or expected outturn may not be in line with Sponsor expectations (4.3);
- Sponsors to consider appointing an Independent Member to the SB to support Sponsors in their decision making. (4.7);
- Each Sponsor should consider the appointment of a Voting Member of the SB as an observer at the CRL Board. (4.8).

1.7.3 CRL Board and Board Committees

Trust between Sponsors and the CRL Board has been undermined by reporting that did not sufficiently surface the probable impact of or the magnitude of the emerging performance issues soon enough.

The CRL Board has been through a period of extensive change. A majority of its membership has changed during 2018, including individuals performing the role of Chair and CEO¹².

Our recommendations consider the further skills and experience which would augment the current CRL Board given the nature of the remaining phases of the project, and also address the roles of Committees of the Board.

The CRL Board continued, until relatively recently, to pursue a pre-planned demobilisation of central resources around a December 2018 Stage 3 opening. This included disbanding the CRL Audit Committee in effect in July 2018 and the re-allocation of its responsibilities (further details can be found in Section 5.6).

Sponsors have held some limited rights as regards CRL remuneration, however, Sponsors have not had direct rights of approval over CRL remuneration decisions. Reflecting the current particular challenging status of the project, Sponsors need to have confidence, and to have and be seen to have a more direct role in ensuring, that remuneration decisions taken during the remainder of the programme are demonstrably in the public interest and linked to the timely and cost effective delivery of the programme.

There was a much reduced level of internal audit coverage in 2017_18 and 2018_19, with insufficient coverage in particular in the critical areas of finance and commercial controls.

Demobilisation reduced central risk oversight and central reporting around commercial and financial risks although CRL considers it did not impact risk management and mitigation at a project level as demobilisation was only focussed on central resources.

¹² In the period since March 2018, all three individuals performing the role of Executive Director have changed. There has also been change to CRL NEDs. In March 2018 there were six NEDs, as of December 2018 there were five NEDs. One of the existing NEDs has become the CEO. Three former NEDs reached the end of their terms of office in June 2018, these three individuals were replaced by three new NEDs, appointed in July 2018.

Critical recommendations for consideration in relation to CRL Board and Board Committees include:

- Sponsors to approve a new Chair of the CRL Board taking account of the essential requirements of the role through completion and handover from CRL to TfL for Elizabeth line operation. Sponsors should be clear as to the accountabilities of the role and the Sponsor expectations of the individual performing it, which should include the requirement for CRL to demonstrate strong and appropriate corporate governance (5.1);
- Sponsors should work with CRL to enhance the capabilities and expertise of the CRL Board through the nomination of new Non-Executive Directors (NEDs) with expertise matched to the current and future requirements of the programme (5.2);
- Sponsors and CRL should agree changes to the procedures around and oversight of remuneration of senior CRL staff. Two options for achieving this are presented (5.3);
- CRL to recognise that greater openness and transparency with Sponsors and timely communication of relevant information is required to reflect the changed circumstances of the project and to set out to Sponsors how CRL will cascade enhanced expectations regarding behaviours, transparency, and culture throughout its organisation (5.4);
- CRL to re-establish the CRL Audit Committee and Risk Sub-Committee as a single combined Committee (the Audit and Risk Committee). The remit of the Audit and Risk Committee should be consistent with standard good practice for an organisation such as Crossrail (5.5);
- The breadth, resources and focus of CRL's internal assurance programme should be enhanced so that there is sufficient focus on project delivery and corporate risks, internal financial and commercial controls and on reporting (5.5);
- With regard to the reporting of risk we recommend consideration is given to more frequent reporting to EIC, to introducing reporting to the CRL Audit and Risk Committee once formed¹³, to re-assessing the sufficiency of central risk resources and to reinstating risk quantification at project level (5.5).

1.7.4 Programme integration

There are a number of TfL secondees performing executive roles with regard to programme delivery and transition to operations (e.g. Operations Director and the newly appointed CEO and FD). These seconded executive director roles are supporting the integration of CRL programme delivery, TfL provision of rolling stock and TfL as the Infrastructure Manager (IM) (through Rail for London Infrastructure (RfLI)).

There was a general recognition among stakeholders and executives of the need for enhanced integration capabilities and capacity within CRL in support of completion of the remaining programme of works. The completion of the Crossrail project and the commencement of operations involves complex systems integration activity. This includes both complex technical integration (e.g. train and tunnel signalling; and SCADA systems integration) as well as programme and organisational integration activities (e.g. procurement and oversight of sufficient numbers of trained operational staff; availability of key technical capabilities for testing (such as fire safety); and operational process interfaces between RfLI, London Underground Limited (LUL) and MTR Corporation (Crossrail) Limited (MTR)). Sufficient integration capabilities are required so as to ensure CRL is able to understand and successfully integrate the different critical paths of activity.

We are aware that CRL has recently procured an independent report on programme management and technical integration and is taking steps to address the recommendations arising but we have not seen a copy of that report, details of its recommendations, CRL's resulting action plan or details of progress made in implementing agreed actions¹⁴.

There was insufficient clarity around reporting of whole programme performance. To understand whole programme performance requires an assessment of a number of separate critical paths and their inter-dependencies. Not all of these are wholly within CRL direct control. The rolling stock was

¹³ The Audit and Risk Committee should be formed as soon as possible.

¹⁴ We have seen a copy of the scope of work but not the resulting independent report which we understand was received by CRL in draft and possibly in final form, during the course of our review.

procured by Rail for London (RfL) although the relevant contract management team is based within CRL, working to the CRL Operations Director who has a dual reporting line to the CRL CEO, and to the LUL Managing Director (MD)¹⁵. Operational readiness is a function of CRL, TfL and NR managed activities.

Programme assurance has also not consistently covered all elements of the programme, the integration of the programme or operational readiness.

CRL has taken action to update the programme governance arrangements to reflect the changing nature of the programme requirements. For example CRL established the Elizabeth Line Strategic Steering Group (ELSSG) to support integration of the programme elements required for the operation of the Elizabeth line, including handover to the IM and integration of the rolling stock. However, the revised governance arrangements and their operation has not sufficiently reflected the changing balance between construction, systems, integration and operational readiness activities. In consequence they have insufficiently addressed the complexities of the programme, in particular the programme integration challenge.

The changing nature of the programme requirements means that Sponsors and CRL also need to take action to update the arrangements for the termination of the joint sponsorship model. Specifically this needs to take account of the current stressed status of the programme and the handover to the operation of a railway. The current arrangements do not sufficiently address the evolving needs arising from the changing balance between construction, systems, integration and operational readiness activities in the circumstances of the current stressed programme status.

CRL also operates a Programme Delivery Board (PDB). There is overlap between the PDB and ELSSG in terms of representation, responsibilities and reporting. Furthermore interviews noted challenges in the operation of both entities. The ELSSG was identified as having been conceived as a senior strategic decision forum which had ultimately become an informal and detail focused body. The PDB was noted as being comprised of two full day meetings with over 20 participants. Interviewees commented that these forums could be more focused, should emphasise critical issues, and attendance by both CRL personnel and partner organisations should be tailored to ensure that the key remaining delivery, integration and operational issues are addressed.

The planned arrangements for handover by CRL from programme delivery to TfL for operation of the Elizabeth line, are subject to change as a result of the programme schedule slippage. Plans and responsibilities will need to adapt accordingly.

Critical recommendations in relation to programme integration include:

- Sponsors to update current arrangements for the termination of the joint sponsorship model. This is required to reflect the changes to expected completion timelines and potential overlap between programme completion activity and the operation of the Elizabeth line (6.1);
- Sponsors to review and agree the actions which CRL has determined to implement in response to the recommendations set out in the independent report recently procured by CRL to review programme management and technical integration challenges. Sponsors to monitor CRL's progress in implementing resulting agreed actions and CRL's assessment of whether the steps taken are adequately addressing the underlying issues. (6.4);
- CRL to create an effective systems integration leadership / authority with a clear and appropriate remit, together with measurable objectives which are regularly reported against and monitored (6.4);
- CRL to review and take actions as may be necessary to ensure there are appropriate mechanisms under its control for the timely and effective integration of all key supplier and partner contributions to the programme including in particular in relation to NR (6.6);

¹⁵ The CRL Operations Director is a TfL employee and executive director of CRL. The role has reporting lines into both the CRL CEO and LUL MD, this reflects the nature of the role in preparing for the operational running of the railway, the extent of reporting into the LUL MD has varied over time. We note that the previous LUL MD, Mark Wild, was also a CRL NED; Mark Wild has recently been seconded to CRL becoming the CRL CEO and has relinquished the role of LUL MD.

- Sponsors and CRL to update and clarify the arrangements and mechanisms for CRL handover to TfL (RfL, RfLI, LUL) (6.8)

1.7.5 Commercial reporting, oversight, controls and processes

CRL performance monitoring and reporting has not led to timely / adequate¹⁶ advance notice being provided of the need to materially change the Stage 3 opening date and the resulting significant cost impact.

Cost scenarios prepared by CRL at Sponsors' request and tabled at the March 2018 SB, critically did not take account of the potential impact of any material irrecoverable delays in infrastructure works which had a much more substantial cost run rate than the issues addressed in the scenarios¹⁷.

Effective reporting of programme status relies inter alia on:

- Effective contract management, monitoring and oversight by contractors of their supply chains; of contractors and supply chains by CRL; and on
- Effective reporting systems and flows of information up through CRL from project and commercial teams, through to management, on to EIC, and then to the CRL Board and thereafter to Sponsors.

The resultant reporting within and by CRL was neither sufficiently timely nor sufficiently clear as to the impacts and magnitude of the range of probable consequences of the issues within the programme.

CRL management explained to us that its understanding of the project costs and timeline as reported through the project management teams and systems was evolving and changing at pace during the first half of 2018 and that there were many challenges to schedule and milestones and that a variety of actions were being taken to address the challenges identified. It is evident that there were formal discussions taking place between CRL and Sponsors around these matters and we were told that there may also have been informal discussions¹⁸.

Evidence of formal discussions around these matters is apparent from, for example, in the minutes of the June 2018 SB which record that Sponsors asked CRL to provide information for the next checkpoint (in effect the July SB) on: confidence in December delivery, alternative options to December, including a delayed opening or a reduced frequency or partial opening. We note that a document entitled "Stages 2-5 Readiness" dated 25 June 2018 and tabled by CRL at the June SB showed the Stage 3 opening date of 9 December as "Green" with no variance against a 9 December 2018 opening date although a significant number of the preceding Stage 3 milestones and activities were clearly shown as red or amber as shown in Table 1:

¹⁶ "adequacy" when assessed in the context of the length of the Crossrail programme and the magnitude of changes to forecast time and cost outturn recently announced

¹⁷ Scenario A (with 3 different options) assumed no delay to Stage 3 opening but with the potential need to accelerate. Scenario B considered 3 different delay options but in all cases assumed that all infrastructure works would still be finished as planned and that delay would arise during systems or dynamic or software testing or due to the lack of a viable train. Allowance was made for around █████ per month costs for maintenance, upkeep and safe operation of the infrastructure in the event of a prolonged train control and/or system operating delay. A █████ delay scenario assumed delay due to a serious event that caused wholesale re-programming. We note that Jacobs' Cost Scenario Report of June 2018 reported that at a meeting with the Joint Sponsor Team (JST) in March 2018, CRL had stated that it felt the book-ends of the cost projections lay between Scenario A, Range 2 and Scenario B, Range █████, equating to a £200m to £300m increase in cost above IP2 at P50.

¹⁸ We were not provided with evidence as to the fact of informal discussions and it was outside of our Terms of Reference to investigate whether and if so what informal discussions occurred.

Table 1: Stages 2-5 Readiness Milestone / Activities

Milestone / Activity	Green	Amber	Red
Dynamic Testing	4	1	3
Pre-Trial Running	4	2	3
Combined Elizabeth line trials	1	4	0
Passenger Service	5	0	0
LU and RfLI Stations – Staged Completion for familiarisation and Trial Ops	7	1	0
Infrastructure, Trains and Testing	0	2	4
MTR, NR, LU and RFLI readiness	0	4	1

It is also evident that there was regular reporting each period on forecast cost outturn and timeline inter alia in the CRL Board reports during 2018¹⁹ and in Project Representative (P Rep) reports²⁰. We have based our comments and recommendations on what is recorded in the papers and documents that we have reviewed including the formal minutes of meetings.

It is clear from the reporting of CRL and of the P Rep that a large volume of work was being undertaken to mitigate delays, re-sequence works and search for alternative approaches to testing and commissioning to maintain the opening date. A feature of the increasing stretch or optimism, however, was a failure to identify, and / or report on a timely basis, the point at which it became unrealistic to expect all remaining activities to be completed within the diminishing timeframe for planned Stage 3 opening and which should have led to revised expectations as to time and cost outturn being developed and reported.

More generally, we consider there was insufficient information in CRL Board reports (i) around actual and likely performance of individual contracts and related integration activities to enable an accurate and sufficient understanding of their likely outturn and impact on the programme; and (ii) of useful trend and other analysis to enable an adequate understanding of historic performance against plan in the context of assessing forecast cost and time to completion.

Finally we note that since 2017 the CRL risk management process has been split between the site teams who perform qualitative risk assessments (previously they also performed detailed quantitative assessments) and the central management risk team which now performs the quantitative analysis

¹⁹ We note in this regard that the Crossrail Cost Scenario Review report prepared by Jacobs and dated 19 June 2018¹⁹ stated: *“In early March 2018 CRL presented to JST its document entitled AFDCD Scenarios whereby it proposed two scenarios and developed costs for three options within those scenarios, in order to establish and describe an estimated upper and lower limit of funding requirements (known as the ‘book-ends’). During this meeting CRL stated that it felt the book-ends of the cost projections lay between Scenario A, Range 2 and Scenario B, Range 3 month delay, equating to a £200m to £300m increase in cost above IP2 at P50.”*

We note the CRL Board Report for period 4 2018_19 [24 June to 21 July 2018] shared with Sponsors addressed *“Are we on time” inter alia as follows:*

“Overall delivery is 94.4% complete vs. planned of 96.3%. 0.6% was achieved in the Period against the plan of 0.7%. Work remains ongoing to evaluate the impact of schedule delays to critical path activities on Stage 3. Alternative scenarios have been identified and communicated, with an executive review planned in Period 5. The drive to complete all physical works and handover each element to the IMs in accordance with the agreed stage completion dates remains resolute.”

The same CRL Board Report commented overall: *“Steady but vital progress continues to be made across the project, but in order to mitigate further schedule slippage, each contract is working on detailed plans to demonstrate the steps they are taking towards handing over their sites to the IMs. Despite this, significant overall schedule pressures exist across the programme and work remains ongoing at a project level to identify and evaluate the impact of schedule delays on critical path activities ahead of Stage 3. Alternative scenarios have been developed with Executive, Board and Sponsor reviews planned in August and September to discuss the schedule pressures and proposals for a revised delivery strategy. The drive to complete all physical works and handover of each element to the IMs in accordance with agreed stage completion dates remains resolute as this is key in minimising further cost growth.*

Overall, the project has now reached 94.4% complete. In the Period, the AFDCD remained unchanged at £12,810m (£297m above IP2). In the next few weeks, further defined-cost reviews will be held with key contracts in our ongoing review of emerging costs and additional cost increases in light of schedule pressures. These increases are in the process of validation ahead of being reported next Period.”

²⁰ The role of P Rep is performed by Jacobs. See Appendix 5 for example relevant extracts from P Rep reports during March to August 2018.

across the project. The latter has been reduced to two people as part of the demobilisation plans aligned to a Stage 3 December 2018 opening.

1.7.6 Remainder of the project – CRL reporting

Sponsors should remain accountable for the successful delivery of the whole Crossrail programme, (to a timescale that has yet to be determined and a budget that is heavily dependent on the time to complete the infrastructure works) with CRL in turn held responsible for the successful integration and delivery to an agreed timeline and budget (4.1). It will be critical for the Sponsors to satisfy themselves around the development of the delivery plans with associated estimates of time, cost, risk and assessment of scope adjustments required to open the Elizabeth line as early as practicable (7.2).

Once the plan is agreed the Sponsors and CRL will both need to establish adequate controls, reporting and assurance that the programme is on track or that adequate action is taken at the appropriate time to maintain progress within budget.

Critical recommendations during the initial planning phase include:

- Establish the reserved matters that require CRL to seek Sponsor approval (7.4);
- Agree timescales for the development of the initial programme by the new CRL CEO and then the development of that programme (7.8, 7.12);
- Obtain independent assurance of the CRL programme with a deep dive into the estimates for time and cost and providing scenarios based on various scope and other options (7.8);
- Review the funding envelope and define the process for the timing and release of additional funding against identified risks (7.1).

Critical recommendations after the agreement of the initial programme include:

- Agree the critical milestones that provide the Sponsors with a transparent view of performance (7.5);
- Define the method for obtaining assurance that CRL reporting is sufficient, accurate and transparent (Exec 1²¹);
- Agree the metrics and analysis required from CRL in its performance reporting to allow the Sponsors to make their own assessment of whether the progress being achieved is in line with the plan (7.3 and 7.13);
- Define what Sponsors' wish to receive from CRL in the form of variance analysis and a summary of mitigation actions where performance achieved is behind that planned (7.5).

1.7.7 Sponsor assurance

The P Rep reported many of the key issues and risks to the achievement of the Stage 3 opening date but did not provide an assessment of the potential / likely impact on the opening date.

Jacobs was asked to prepare an independent review of the approach taken by CRL in the development of scenarios on the costs to completion and reported thereon in June 2018. However, Jacobs did not set out in its report to Sponsors that an additional scenario in which CRL materially failed to recover its delays to infrastructure works should have been considered and priced. Had CRL and / or R Rep considered such a scenario then such a scenario would have identified a more substantial increase in the AFCD.

The P Rep did not adequately challenge CRL in its assumptions that it could recover their delays to maintain the Stage 3 opening date including as to the achievement of contractor Tier One Contractor Substantial Demobilisation (TOSD) dates and an assumed resulting substantial reduction in the programme cost run rate.

Critical recommendations for Sponsors include:

- Confirming the requirements to be placed on the P Rep to provide whole programme assurance. P Rep should set out the approach it intends to follow to provide this assurance for the remainder

²¹ Recommendations included only in the Executive Summary are set out in Section 1.8.3

of the programme. Sponsors should then review, iterate as necessary, and agree an approach with P Rep which Sponsors consider to be appropriate and sufficient (8.1);

- Consider obtaining regular, independent advice which enables Sponsors to judge whether P Rep's current remit and outputs are providing sufficient assurance to Sponsors across the full range of programme challenges or whether additional steps are required to assess and consider the information being received in relation to the programme (Exec 1).

1.8 Moving forwards

1.8.1 Addressing the issues

We have set out above and through this report, and in our other report on financial and commercial matters, a number of recommendations for consideration to address the issues identified.

We have noted that the issues we have highlighted need to be addressed at pace if Sponsors and CRL are to give themselves a good chance of managing the completion of the programme within the cost envelope announced on 10 December 2018.

There will still be significant challenges to be faced in completing the infrastructure works, the routeway, systems, signalling and systems integration and dynamic testing and then in commissioning.

Addressing the issues highlighted in this report and in the separate financial and commercial report will mean that the Sponsors and the project will be better placed to identify challenges in a timely way, will have the right expertise on hand, will have better visibility of performance and emerging commercial issues and will be able to deal with challenges promptly. Improvements to reporting and programme sponsorship etc will not in themselves make the difficulties of completing the project go away, but they will facilitate early visibility of issues and identification of the right actions and interventions, enable transparency and provide an environment in which the complexities of completing this project successfully have a much enhanced chance of being overcome more smoothly.

1.8.2 Early visibility of emerging critical issues and recommendations

An early outline for consideration by Sponsors of issues and our critical recommendations emerging from completing the fieldwork in addressing both Terms of Reference, was shared with Sponsors at the 15 November 2018 SB. At Sponsors' request we then supported Sponsors in sharing the critical recommendations relevant to CRL with members of the CRL Executive on 22 November 2018. This was so as to provide a basis for CRL's early consideration of the identified issues and to allow CRL to accelerate actions in response, given our strong recommendation to Sponsors that both Sponsors and CRL taking the right actions at pace to address the issues identified was critical to constraining project overrun costs. The issues discussed with members of the CRL Executive on 22 November 2018 which were relevant to this report were as set out below.

- Developing a robust updated MOHS
- Developing a robust updated cost estimate
- Improving CRL reporting including enhancing metrics, setting milestones for reporting against and establishing early warning reporting
- Resourcing – identifying and addressing central resource gaps
- Enhancing certain management controls and re-setting financial controls
- Defining, assessing and approving commercial strategy
- Driving contractor performance
- Reinforcing culture and cascading enhanced expectations around openness in reporting throughout the project and avoiding optimism bias

- Addressing the identified issues from our reviews and the related practical day to day management steps recommended to oversee timely implementation
- Strengthening integration governance
- Enhancing systems integration leadership and capability
- Mechanisms necessary for integration of supplier and partner contributions
- Strengthening the three lines of defence including broadening internal assurance coverage of commercial and financial matters;
- Establishing the Audit and Risk Committee

1.8.3 Remainder of the project – CRL reporting, addressing our recommendations and related Sponsor assurance

Sponsors will face significant challenges, going forwards, in assessing CRL reporting and related Sponsor Assurance, and in implementing our recommendations. In particular key challenges will include Sponsors' need to assess:

- Whether the pace of change in the nature, quality, and extent of, CRL reporting is providing sufficient transparency and a realistic assessment of progress and forecast outturn as to time and cost; and
- The extent to which the recommendations in this report and the related financial and commercial report have been implemented and whether the manner and pace of their implementation by Sponsors and CRL is sufficiently addressing the underlying issues they were designed to address. This will be particularly challenging given the relatively short amount of time within which some of these matters need to be implemented. This together with the pace of the programme may therefore necessitate, with Sponsor agreement, the application of judgement in some instances as to the sensible degree of pragmatism which should be applied when determining the design of what should be implemented.

We have therefore recommended that Sponsors:

- Seek independent advice on these matters (Exec 1);
- Create an action plan and ensure CRL creates their own action plan using a similar overall design, to be agreed with Sponsors (Exec 2); and
- Develop an approach to the oversight and monitoring of the implementation of the consolidated action plans (Exec 2).

Table 2: Executive Summary Recommendations

EXECUTIVE SUMMARY RECOMMENDATIONS	
Exec 1	<p>Sponsors to define the method for obtaining assurance that CRL reporting is sufficient, accurate and transparent.</p> <p>Sponsors to consider obtaining regular and independent advice which enables them:</p> <ul style="list-style-type: none"> — To judge whether P Rep’s current remit and outputs are providing sufficient assurance to Sponsors across the full range of programme challenges or whether additional steps are required to assess and consider the information being received in relation to the programme; — To assess whether the pace of change in the nature, quality, and extent of, CRL reporting around programme progress, forecast cost outturn and key risks is likely to provide sufficient transparency of programme status, likely outturn, and key risks net of mitigating actions being taken. In particular whether the metrics being reported are sufficiently reliable and tailored to the differing needs of construction, systems and integration etc. activities to provide sufficient visibility of current and expected performance and outturn; — To assess periodically and more deeply (for example at pre-defined stages) if project status and likely cost and time outturn broadly aligns with that being reported; <p>To assess whether the shape and pace of addressing the issues highlighted by / implementing the recommendations in this independent report on the review of governance arrangements and in the related report on financial and commercial matters, is progressing as it ought and whether the actual steps being taken are sufficiently addressing the underlying issues.</p>
Exec 2	<p>Sponsors to draw up an action plan comprising the recommendations for Sponsors set out in this and the related financial and commercial report. Agree and record within the action plan, the actions to be taken, prioritisation, timelines, and responsible individuals.</p> <p>Define the extent of progress which Sponsors wish to see achieved from their own and CRL actions, by pre-set milestone dates in each of the critical priority areas, such as in the case of CRL, creation of a sufficient schedule, enhancing CRL reporting etc.</p> <p>Define the means by which assessment will be made of the progress in implementing Sponsor and CRL actions and of the extent to which each underlying objective has been achieved. Define how these matters will be independently assured, and to whom and how frequently the implementation progress and results of the independent assurance will be reported.</p> <p>Agree with CRL an appropriate set of arrangements including initial agreement between Sponsors and CRL of the actions proposed to be taken by CRL and by when, arrangements for period visibility of a copy of the CRL action plan updated for progress in closing agreed actions and the results of CRL’s own regular monitoring, assessment and independent assurance of the implementation and impact of the actions.</p> <p>The initial agreement between Sponsors and CRL of actions to be taken will need careful consideration by Sponsors of:</p> <ul style="list-style-type: none"> — The prioritisation sequence proposed by CRL — The timeline proposed for implementation — How satisfactory completion of an action is proposed by CRL to be established — Where CRL concludes that the approach to addressing an issue needs to be varied from that outlined in a recommendation so as to enable more rapid addressing of the underlying issue, then Sponsors will need to satisfy themselves that the changed approach will be sufficient to address the underlying issue highlighted <p>Define how, how often and by whom, the rolled up action plan (Sponsors’ and CRL actions plans combined) will be reviewed and the means by which resulting required actions will be communicated and in turn followed up.</p>



Independent review of Crossrail – Financial and Commercial

Prepared for TfL and DfT

23 January 2019

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Glossary

AFDCD	Anticipated Final CRL Direct Cost
AFC	Anticipated Final Cost
ARM	Active Risk Management
BRS	Business Rate Supplement
CBTC	Communications Based Train Control
CCR	Cost Consideration Report
CCSA	Contract Commercial Status Analysis
CCSC	Commercial and Change Sub-Committee
CD	Commercial Director
CEO	Chief Executive Officer
CFO	Chief Finance Officer
CMS	Central Management System
COS	Central Operating Section
COWD	Cost of Works Done
CRL	Crossrail Limited
DfT	Department for Transport
DOO	Driver Only Operation
EIC	Executive and Investment Committee
ELRB	Elizabeth line Readiness Board
ELSSG	Elizabeth line Strategic Steering Group
FD	Finance Director

FLU	Full Length Unit
FRC	Financial Reporting Council
GLA	Greater London Authority
H&S	Health & Safety
HMG	Her Majesty's Government
HMT	Her Majesty's Treasury
IAAP	Integrated Assurance and Approval Plan
IA	Internal Audit
ICE	Institution of Civil Engineers
IM	Infrastructure Manager
IP	Intervention Point
IPA	Infrastructure and Projects Authority
JST	Joint Sponsor Team
KPI	Key Performance Indicator
LUL	London Underground Limited
MD	Managing Director
MTR	MTR Corporation (Crossrail) Limited
MOHS	Master Operational Handover Schedule
NEC	New Engineering Contract
NED	Non-Executive Director
NR	Network Rail
ONW	On Network Works

ODA	Olympic Delivery Authority
OSEP	Operations and Systems Expert Panel
PCD	Programme Controls Director
PDA	Project Development Agreement
PDB	Programme Delivery Board
PM	CRL Project Manager
P Rep	Project Representative
QCRA	Quantitative Cost Risk Analysis
QRA	Quantified Risk Assessment
RAP	Remedial Action Plan
RemCo	Remuneration Committee
RfL	Rail for London
RfLI	Rail for London Infrastructure
RLU	Reduced Length Unit
SA	Sponsor Agreement
SACR	Semi Annual Construction Report
SB	Sponsor Board
SC	Staged Completion
SoS	Secretary of State
SQRA	Schedule Quantified Risk Assessment
TCR	Tottenham Court Road Station
TEV	True Expected Value

TfL	Transport for London
TOSD	Tier One Contractor Substantial Demobilisation
tph	Trains per hour
URT	Unresolved trends

1 Executive summary

1.1 Introduction

1.1.1 Background

At the end of August 2018 Crossrail Limited (CRL) announced that the opening of Stage 3, the Central Operating Section (COS), of the Crossrail project (the project) would be delayed from December 2018 to Autumn 2019. An Adverse Event Notice, in accordance with clause 22 of the Project Development Agreement (PDA), was issued to Sponsors on 30 August 2018.

Transport for London (TfL), a joint sponsor with the Department for Transport (DfT), appointed KPMG on behalf of both Sponsors in late September 2018 to carry out two independent reviews of the Project.

Prior to the appointment of KPMG and after receipt of the Adverse Event Notice, the Sponsors requested CRL to prepare a Remedial Action Plan (RAP 1). It was issued on 18 September 2018 and was followed by an update (RAP 2) on 2 October 2018. RAP 1 and RAP 2 are jointly referred to as the 'RAP' in this report.

KPMG was asked by Sponsors to review RAP 1 shortly after it was released in September 2018. This review is guided by the Terms of Reference provided by the Sponsors to assess the reliability and robustness of the revised schedule and cost put forward by CRL. RAP 2 was issued during the course of our assessment and extended the scope of our review to include RAP 2.

CRL was also at the time of our fieldwork updating its Master Operational Handover Schedule (MOHS) that was due to be issued in October 2018. However, at the time of finalising our fieldwork in December 2018 the updated MOHS had not been issued and our reports do not take into consideration any time or cost information other than that contained within the RAP documents except where expressly stated in this report.

1.1.2 Scope of KPMG's work

The scope of our reviews were separately defined in two sets of Terms of Reference:

- Financial and commercial independent review;
- Governance independent review.

This draft report addresses the financial and commercial Terms of Reference (which are set out at Appendix 1). Our governance review is covered in a separate report.

1.1.3 This report

This report has considered the particular financial and commercial implications arising from the current stressed¹ status of the Crossrail project, and from the uncertain project cost and completion timelines. The scope of work we were asked to address in our review of financial and commercial matters, is attached as Appendix 1. It is important to note the scope requires that this review should address "*CRL's assessment of the ongoing funding requirement, cash forecast and commercial and governance arrangements*". In addressing the ongoing requirements we were guided to have regard to the preceding 12 months.

Accordingly this report does not seek to review the operation of CRL or its funding, cash forecast, commercial management and governance arrangements in earlier years. We note the many reported

¹ "Stressed" in terms of the project having needed on 10 December 2018 to significantly change expectations as to outturn timeline for Stage 3 Opening and as to cost, and the related significant uncertainties and related challenges which remain to be addressed

opening, leaving non-essential systems to be completed after opening, but we expect such related post-opening costs should be able to be contained within the pessimistic scenario within our sensitivity analysis assuming Stage 3 opening occurs in or close to [REDACTED] and assuming delays in achieving tier one contractor³ substantial demobilisation are sufficiently managed.

The achievable Stage 3 opening date is a function of many unknowns as well as the steps being and to be taken by CRL to de-risk that date by [REDACTED]

[REDACTED] In the event the Stage 3 opening date were to slip materially later than [REDACTED] accompanied by added delay to substantial demobilisation of the principal contracts, there is a significantly reduced likelihood that costs will be contained below the pessimistic scenario.

1.2 Crossrail programme – history and context

The Crossrail Act 2008 permitted the construction of the Crossrail railway from Maidenhead and Heathrow in the west to Shenfield and Abbey Wood in the east, with new rail tunnels (and stations) under central London as required. The funding deal for the scheme was complex but the basic principle was simple – the cost would be shared between the Government, TfL and the business community.

Crossrail broke ground on 15 May 2009 at Canary Wharf, when the Mayor and the Transport Secretary launched the first pile into the North Dock in Docklands at the site of the new Canary Wharf station.

In 2010, the Government's Comprehensive Spending Review confirmed savings of over £1bn in projected Crossrail costs. This was reported as due chiefly to a revision of the tunnelling strategy⁴ and due to "improved station and engineering solutions and a more efficient construction timetable"⁵. This meant that Crossrail services would commence through the COS in 2018 rather than 2017, followed by a phased introduction of services across the rest of the route, but it also allowed the funding envelope needed to deliver Crossrail to be reduced to £14.8⁶bn from £15.9bn.

Crossrail tunnelling began in May 2012 and ended in May 2015. As noted above, we have not been asked to review the overall Crossrail project and its many achievements. For context we note from Crossrail's own website⁷ that it summarises the project as follows:

"Crossrail is among the most significant infrastructure projects ever undertaken in the UK. From improving journey times across London, to easing congestion and offering better connections, Elizabeth line will change the way people travel around the capital."

It also notes the following general information:

- ***"Crossrail Limited is building the Elizabeth line - a new railway for London and the South East, running from Reading and Heathrow in the west, through 42km of new tunnels under London to Shenfield and Abbey Wood in the east."***
- ***The Crossrail project is currently Europe's largest infrastructure project.***
- ***The new railway, which will be known as the Elizabeth line when services begin through central London, will be fully integrated with London's existing transport network and will be operated by Transport for London.***
- ***The Elizabeth line will stretch more than 60 miles / over 100km from Reading and Heathrow in the west through central tunnels across to Shenfield and Abbey Wood in the east.***
- ***An estimated 200 million annual passengers will use Crossrail.***
- ***The Elizabeth line will serve 41 stations including 10 new stations at Paddington, Bond Street, Tottenham Court Road, Farringdon, Liverpool Street, Whitechapel, Canary Wharf, Custom House, Woolwich and Abbey Wood.***

³ Including tier one contractor supply chains

⁴ <http://www.crossrail.co.uk/route/crossrail-from-its-early-beginnings>

⁵ Crossrail Limited: Programme Overview Report, December 2010

⁶ Including NR ONW and Depot costs

⁷ Elements of this sub-section are drawn from the contents of the CRL website as at December 2018

- Construction of the new railway will **support regeneration across the capital** and add an **estimated £42bn to the economy of the UK**.
- Over **130 million working hours** have been completed on the Crossrail project so far.”

We note that CRL management has highlighted to us “*the many years of successful delivery, the completion of the largest ever tunnelling works, station civil works, [and] implementation of much of the highly complex track, including floating track slab works, through the centre of London with very little disruption*”.

The project has been subject to reviews and independent scrutiny. One such example was a July 2014 Public Accounts Committee (PAC) report. The PAC July 2014 report noted “*The Crossrail programme is proceeding well and is on course to deliver value for money to the taxpayer. The joint sponsors of the Crossrail programme, the Department for Transport (the Department) and Transport for London, are working well with the delivery organisation, Crossrail Limited, to deliver the programme, which at present is broadly on schedule and being delivered within budget*”. This report however cautioned that “*construction is not yet complete, and considerable risks remain in delivering the programme by 2019, particularly managing the transition from building the railway to operating it, and delivering the Crossrail trains*”.

In the same year a National Audit Office (NAO) report noted that “*During the construction phase, the governance arrangements and oversight of the project have ensured tight management of the programme so that delivery to both cost and schedule are well managed*”.

The NAO 2014 report also noted a need to consider the future transition from construction to operations. It recommended that “*the Department [DfT] now needs to [f]inalise its plans for the development of governance arrangements as appropriate for the transition from construction to operations, over the next five years. The Department should work with Transport for London, Crossrail Limited and Network Rail to produce a transition plan of similar clarity to the founding programme agreements*”.

During interviews for this report the DfT noted that following the NAO recommendations, action⁸ had been taken to consider the future governance arrangements required for the transition from construction to operations.

This report has considered the particular governance implications arising from the departure from “business as usual” to the current stressed status of the Crossrail project, including from the uncertain project cost and completion timelines.

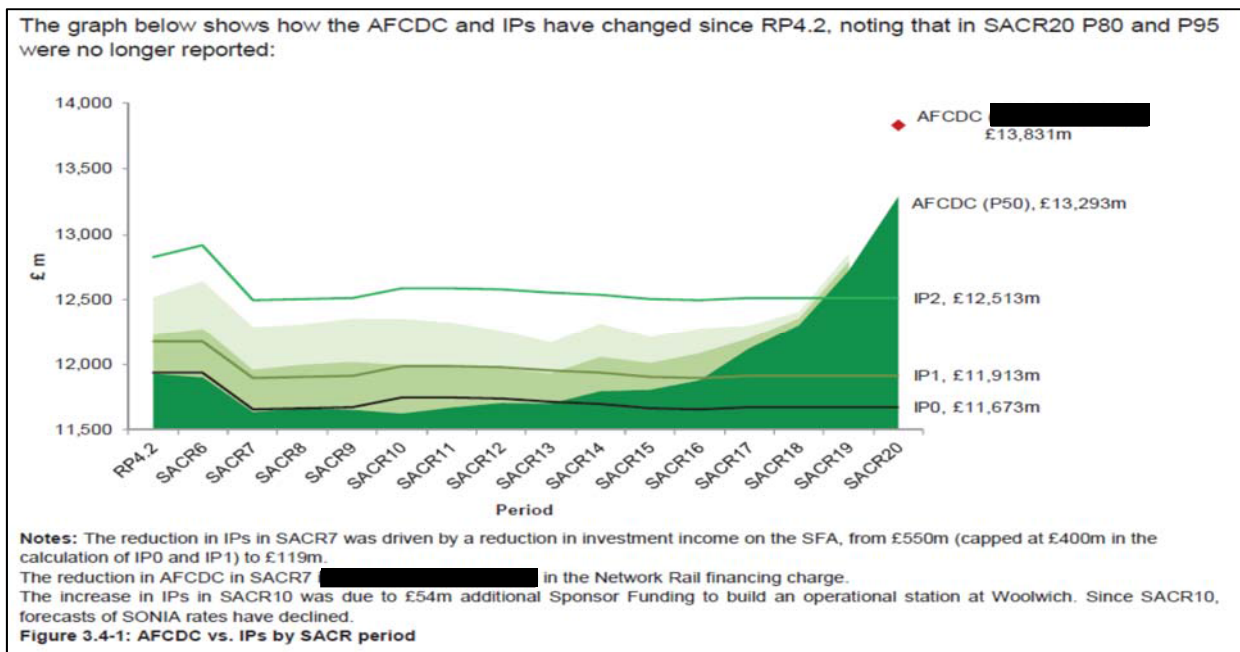
With regard to forecast outturn cost, we note that CRL’s recent 6 monthly Semi-Annual Construction Report (SACR) 20⁹ report summarises the Anticipated Final CRL Direct Costs (AFCDC) as reported over the last 7 years or so. We note that total Crossrail Project costs (which had an affordability envelope of £14.8bn) comprise in addition to AFCDC, the Network Rail (NR) On Network Works (ONW) costs and Depot costs. This report is only concerned with matters related to AFCDC.

The reported AFCDC over the last 7 years or so, is set out in the graph at Figure 1 culminating in the recent increase in AFCDC referred to under section 1.3. The graph shows the reported AFCDC in each SACR report (these are produced 6 monthly). The dark green area represents what was reported as P50, and the lighter greens, P80 and P95 which have converged as the project has progressed. One can see significant increases in reported P50 AFCDC after SACR 16, and in reported P95 AFCDC after SACR 18, based on the graph.

⁸ It was not part of our Terms of Reference to review actions taken in response to the NAO 2014 report and we have not sought to do so.

⁹ SACR 20 covers the period from 1 April to 15 September 2018

Figure 1: Crossrail - Change in AFCDC and Intervention Points (IPs) since RP4.2 in May 2011



Source: SACR 20

Note: Each SACR covers a 6 month period ending March or September with SACR 20 being the period 1 April to 15 September 2018. The P50 number of £13,293m shown in the above graph (as extracted from SACR 20) was the AFCDC P50 value reported by CRL in its Period 06 Board Report. SACR 20 used the P95 [redacted] dates value of £13,831m, as agreed with Sponsors as the AFCDC for the purposes of SACR 20. This reflected the latest information available through RAP2.

1.3 Recently announced outturn cost and funding

CRL has recently announced a significant increase in cost to completion and the delayed opening of the Elizabeth line. To complete the project, there remains significant work to be performed, in particular the completion of the stations, train testing, systems integration and transition to operations. At the time we were completing our fieldwork, CRL was developing a revised MOHS and estimated cost to completion.

On 26 October 2018, the Government announced, as an interim measure, that £350 million of short term repayable financing would be made available to the Mayor for the year 2018_19. The purpose was to “ensure that full momentum is maintained behind Crossrail”.

On 10 December 2018 TfL issued a press release which stated inter alia:

“The emerging findings of the KPMG review into Crossrail Ltd’s finances indicate the likely capital cost impact of the delay to the project announced in August could be in the region of between £1.6bn and £2bn¹⁰. That includes the £300m already contributed by the Department for Transport (DfT) and TfL in July 2018, leaving an estimated £1.3bn to £1.7bn to complete the project.

The Mayor of London and the Government have agreed a financial package to cover this. The Greater London Authority (GLA) will borrow up to £1.3bn from the DfT. The GLA will repay this loan from the existing Business Rate Supplement (BRS) and Mayoral Community Infrastructure Levy (MCIL). The GLA will also provide a £100m cash contribution, taking its total contribution to £1.4bn which it will provide as a grant to TfL for the Crossrail project.

¹⁰ This equates to a forecast outturn AFCDC of £14.1bn to £14.5bn respectively, as compared with a budget of £12.5bn.

Because the final costs of the Crossrail project are yet to be confirmed, a contingency arrangement has also been agreed between TfL and the Government. This will be in the form of a loan facility from the DfT of up to £750m, should the higher end of the estimate be realised.

This combined financing deal will replace the need for the £350 million interim financing package offered by the Government in October.”

1.4 CRL Board changes

Changes have already been implemented with regard to CRL leadership. The Chair of the CRL Board has resigned, a replacement is being sought, and there is a new Executive management team in place within CRL. The new Chief Executive Officer (CEO) and Finance Director (FD)¹¹, are both TfL secondees, appointed at the behest of Sponsors.

1.5 Principles and report assumptions

A set of principles guided the development of the recommendations in this report. The principles are derived from the assessment of the current project status, the current operation of the financial and commercial arrangements and the specific requirements of the forward programme. As such the recommendations in this document should do the following:

- Reflect the stressed status¹² of the project.
- Support the rebuilding of trust between Sponsors, CRL Board and CRL Executive.
- Deal with any identified deficiencies in the current financial and commercial arrangements in the context of the situation in which the programme now finds itself.
- Support increased transparency at all levels of the programme.
- Be forward looking, aimed at supporting the project through to completion.
- Be proportionate and practicable. Recommendations must be capable of implementation within timeframes that have a practical and timely effect on the project.
- Maintain clarity and separation of Sponsor and CRL roles.

The following assumptions informed the recommendations contained in this report:

- Sponsors will agree additional funding facilities sufficient to cover the expected costs of the effective execution of the balance of the programme, together with appropriate mechanisms for bearing risk and holding contingency.
- Neither Sponsor has, nor will choose to exercise its “Put” and “Call” rights at this stage.
- Sponsors will remain jointly accountable for the overall programme. The joint Sponsor Board (SB) will continue. Sponsors will not assume formal delivery responsibility.
- CRL will remain the responsible body for the completion of the project in line with the responsibilities articulated in the PDA, this includes management and integration of the whole programme to deliver an operational railway. The CRL Board will continue, but with potential revisions in composition and autonomy.
- Sponsors have confirmed that the CRL Board and Executive team will be given the opportunity and responsibility to address the current issues and deliver the remaining programme.

¹¹ We have used FD to refer to the role of Finance Director previously held by Mathew Duncan but note that David Hendry appointed with similar responsibilities holds the title of CFO. We have used the term ‘FD’ to refer to either the previous FD role or the new CFO role.

¹² “Stressed” in terms of having needed on 10 December 2018 to significantly change expectations as to outturn timeline for Stage 3 Opening and as to cost, and the related significant uncertainties and related challenges which remain to be addressed.

1.6 Our overall approach

Our overall approach to addressing the financial and commercial Terms of Reference was to review documentation provided by CRL and TfL, and hold interviews with certain senior CRL staff, as well as with CRL project managers (PMs) and business managers for the significant live contracts within the Crossrail project. Whilst we had access to certain information received by CRL from Contractors, such as copies of Contractor programmes as provided to CRL, it was not part of our Terms of Reference to seek information direct from Contractors.

The main stages of our review in addressing each element of our Terms of Reference were to address the following:

- Consider the status of the project programme, including contract inter-dependencies.
- Review the costs estimates within RAP1 and RAP2.
- Review the risks, uncertainties, assumptions and exclusions within CRL's estimates and forecasts within the RAP.
- Carry out a review of CRL's funding model.
- Review financial and commercial contract control and governance processes.
- Complete such other tasks as were relevant to our Terms of Reference.

Our overall findings and critical recommendations are summarised at Section 1.7 below followed by our observations and recommendations on moving forwards at Section 1.8. An introduction and additional information on our approach is contained at Sections 2 and 3 respectively. Our detailed findings and the full detail of all our recommendations are set out in the supporting Sections 4 to 12 and in the appendices. For a full understanding of the matters considered the reader should consult the relevant sections and appendices as appropriate.

1.7 Overview of key findings and critical recommendations

1.7.1 General points

Our findings, as previously noted, are drawn from a review of documents and information provided which principally relates to the 12 months up to our fieldwork. In this Executive Summary we have set out an overview of key findings together with critical recommendations. After each critical recommendation we have included the recommendation number in brackets so that the reader can consult the detailed recommendation in Sections 4-12 where, in many cases, there is significant additional detail as well as further recommendations, sometimes related.

The drafting of a detailed recommendation means that we have concluded a change is required either because Crossrail's needs have changed given the project is no longer in a "business as usual" state, or because we found evidence / examples that an important control or process was missing or was not designed and / or operating in line with good practice. The inclusion of a finding / recommendation does not therefore mean that the area has not been operating appropriately throughout the entire Crossrail programme, but it does mean that a change / improvement is now, in our view, needed.

1.7.2 Schedule, Cost and Risk

1.7.2.1 Programme

We reviewed the RAP 1 and RAP 2 timelines to determine the robustness of the dates put forward by CRL for the completion and opening of Stage 3, the Central Operating Section (COS).

RAP 1 presented high level timelines for three schedule scenarios; we focused our review on schedule scenario 2, the preferred CRL schedule option. We examined the critical path which runs through dynamic testing and our further analysis established the critical dependencies and other key risks to the programme.

We also considered the extent to which the RAP incorporated the recommendations in the Rannachan¹³ and Boss¹⁴ reports.

For RAP 2, the emphasis was on the assumptions made for dynamic testing and the tier one contractors' substantial demobilisation dates. RAP 2 introduced the concept of [REDACTED] dates for each of the principal live contracts and we focused our review on testing the robustness of these dates by examining the planning process and assessment of risks used to arrive at the [REDACTED] dates.

We also examined the contractors' schedules focusing on the 13 principal live contracts for the routeway, stations and systemwide. We interviewed CRL staff to validate the schedule risks and assumptions made in producing the RAPs, and to identify any gaps in the CRL senior management's and PMs' views on the achievability of the contracts key dates.

Within RAP 1 and RAP 2, the proposed MOHS is presented as a high level timeline, not a detailed bottom up schedule. Our review of the RAP 1 timeline identified a lack of evidence that the critical dependencies, in particular the dependencies outside of CRL's direct control, had been adequately addressed in the proposed programme showing the Stage 3 opening in July 2019.

The RAP 2 timeline shows a target [REDACTED], [REDACTED] and attempts to address the critical dependency risks by introducing [REDACTED] dates which includes an "assumed increase of [REDACTED] period needed for dynamic testing along with an increase in the duration of Trial Operations from [REDACTED]"¹⁵. We note significant uncertainty remains around the likely timing of readiness to enter the planned dynamic testing phase and the time likely to be required.

We separately note that the time added in moving from [REDACTED] dates would not be sufficient to accommodate the realisation of a strategic risk such as a severe fire or major software bug, if one were to occur.

Key findings include:

- The [REDACTED] dates in the RAP are [REDACTED] dates, derived from a top-down view of the remaining scope of work. [REDACTED];
- Within the RAP there is much more emphasis on the entry criteria for the start of dynamic testing than the scope of what needs to happen to successfully conclude the dynamic testing;
- Changes to the dynamic testing timeline will have comparatively small impacts on the outturn costs, as compared with the station contracts which have significant potential to impact the outturn costs. The [REDACTED] [REDACTED] contract installation and testing activities are critical to the completion of the station contracts and there is still a high level of uncertainty around the interfaces between these contracts. It is imperative that a comprehensive station and systems integration programme is developed and put in place at the earliest opportunity.

1.7.2.2 Cost review

The RAP 1 and 2 cost estimates are derived from high level timelines to Stage 3 completion, not detailed schedules.

Our review found that the critical timeline to the opening of the railway runs through the dynamic testing programme which tests the rolling stock with the infrastructure, particularly the signalling. However, this is not the main cost driver. Cost outturn is mainly dependent on the timing of completion of the infrastructure works, particularly the station fit out, tunnel fit out and communication systems contracts and the single

¹³ Crossrail MOHS Schedule Peer Review prepared by Ian Rannachan dated September 2018

¹⁴ Crossrail Schedule Assurance Review by John Boss dated 17 September 2018

most significant impact on outturn costs will be the date from which, and extent to which, substantial demobilisation of the contractors and their supply chain teams occurs on the major station contracts.

Demobilisation of main contractor and supply chain resources must be achieved to reduce significantly the current expenditure rate of approaching £30m per week. Dates for contractor demobilisation are identified as key dates in the RAP but are not contractual requirements.

[REDACTED]

Achievable progress by Contractors and their supply chains in completing the key activities remaining and the impact of interfaces between some of the key contracts, which in turn will impact the timing of Contractor (tier one and their supply chains) substantial demobilisation, remains a key uncertainty when forecasting outturn costs.

We modelled the AFCDC (ie the CRL direct costs to complete the project, being the Crossrail project costs excluding the NR ONW and Depot costs etc.), based on a top down assessment, using cost run rates applied over assumed programme durations for each key contract so as to create a series of scenarios. CRL used a similar approach but based its analysis on estimating an addition to its previous outturn cost forecast rather than using the cost of work done to date as a base and adding to it a revised estimate of the costs to complete the project.

In choosing our illustrative scenarios for costs to complete the project we deliberately adopted a simplified set of assumptions corresponding with the level of information available. The range of the scenarios was set to encapsulate a carefully considered range of expected performance, adopting cost run rates and the periods over which they were sustained as the key variables. We did not see fit to examine all possible outcomes in detail. For example the tail of activities remaining after the date assumed in RAP 2 for Stage 3 opening ([REDACTED] is subject to significant uncertainty, and is linked to decisions not yet made by CRL (eg about [REDACTED])). Our more pessimistic scenarios have regard to the potential impact of these and other factors.

The approach we adopted was the most appropriate based on the information available, the access provided and the timescale which was short given Sponsors' pressing need for outputs which could inform funding decisions in early December. A more precise analysis would have been difficult to create given the issues at large in relation to the programme, and the limitations in the availability of relevant up to date detailed data from CRL

To create our alternative cost assessment we used our model to perform a sensitivity analysis¹⁷ of six scenarios based on combinations of:

- Three completion date assumptions for each of the 13 principal live contracts taken from:
 - RAP 2;
 - The views of CRL PMs gained through interviews; and
 - Additional delays assumed by KPMG based on information received including during our interviews of CRL staff.
- Two 'substantial demobilisation' date assumptions for the 13 principal live contracts:
 - In accordance with the completion programme within the RAP; and

[REDACTED]

modelling of the high-impact / low-probability risks (strategic risks) in this way results in contingency sums which are far lower than would be required should those risks materialise. This is not an appropriate way to assess these types of strategic risks, and we would expect these to be excluded from the contingency calculation and separately presented with ranges of potential schedule and cost impact rather than as single point estimates included in the Monte Carlo risk analysis.

1.7.2.4 Assumptions and exclusions

The RAP makes assumptions which exclude certain activities and risks from the CRL schedule and cost estimates (which are other than catastrophic risks in nature). Section 7 describes our approach and observations to the RAP's assumptions and exclusions.

Key findings include:

- The dynamic testing programme is uncertain, it does not allow for further delays in the provision of an homologated train or if [REDACTED] fails to complete the necessary routeway installation to support commencement of 5/2 dynamic testing. While there are inherent risks within the dynamic testing process outside of CRL control, we would expect a prudent schedule period for the 5/2 dynamic testing process to be included in the MOHS. Risks associated with contract [REDACTED] should be accounted for by CRL.
- The RAP excludes some infrastructure risks. The completion of the infrastructure works is a CRL responsibility and we would expect the MOHS and RAP cost estimate to take into account all the risks associated with completing the infrastructure works.
- NR possessions – Not all possessions required for transition testing shown on the MOHS have been secured with NR. While the availability of possessions is outside of the control of CRL, we would expect CRL to demonstrate how it plans to mitigate the risks surrounding securing NR possessions to support its programme delivery.
- Lack of clarity as to the basis for the duration apportioned for trial operations. At this stage in the programme we would expect the duration for the trial operations to be based on a detailed plan agreed with the IM and the operator and to include contingency for unforeseen delays whilst recognising that revision may be required.

1.7.2.5 Key recommendations for schedule, cost and risk

Key recommendations for consideration are that Sponsors should satisfy themselves (including where appropriate through independent assurance) that:

- CRL adopt a bottom-up approach to developing the schedule with appropriate assessment of agreed inputs from the tier one contractors²⁰ and the critical dependant third parties (rec. 4.3).
- In compiling the schedule and related cost estimate, CRL:
 - Account sufficiently for the risks associated with, and potential delays to, completing the [REDACTED] contract (rec. 7.1).
 - Allow for sufficient float in the dynamic testing programme, given the uncertainty of this activity (rec.7.2).
 - Ensure there is a clear scope of output specifications for the dynamic testing that defines what success would look like. The scope should be accompanied by a detailed schedule that is communicated to all relevant parties (rec. 4.4).

²⁰ "appropriate assessment of agreed inputs from the Tier 1 contractors" does not mean simply adopting the contractors' positions but it does mean having reached agreement with contractors on milestones and then assessing if an assumed delay or acceleration in performance should be incorporated in the schedule. It also means being clear as to the basis for and reasons for any such assumed delay or acceleration, and for how the contractor performance will be driven to achieve the assumed milestones. Careful monitoring of actual progress will be needed leading to, where appropriate, schedule revisions if actual progress against an agreed or assumed milestone differs from expected performance. It also means ensuring that contractors are responding on their own behalf and that they have in turn obtained appropriate commitments from their own supply chain to meet the requirements of their schedule including as to sufficiency of available resources.

- Include sufficient amounts to address the risks (excluding catastrophic risks) associated with completing all the infrastructure works (rec.7.3).
- Incorporate in the schedule the critical NR possessions, enabling capture of those which are already confirmed (rec.7.4)
- Include allowance for a sufficient duration for trial operations based on a detailed plan agreed with the infrastructure manager and the operator and to include contingency for unforeseen delays (rec.7.5).
- CRL undertake a more detailed outturn cost estimate once the updated completion programme (see Section 4) has been prepared and approved (rec. 5.2).

In addition we recommend that:

- Sponsors should request a bottom-up cost estimate, built on dates drawn from an updated MOHS²¹. It should be independently verified that the updated MOHS is robust and takes appropriate account of contractors' views on performance and delay (recs. 6.1 and 11.6) and that the resulting cost estimate has been robustly and reasonably prepared.
- It is imperative that a comprehensive station and systems integration programme is developed and put in place at the earliest opportunity (rec.4.5).
- In relation to risks, we recommend that CRL should
 - Adopt a consistent approach in the modelling of schedule risk, commercial risk and contingencies (rec. 6.2).
 - Reconsider the programme risks excluded from the cost model, in particular the excluded infrastructure risks which are CRL's responsibility to manage and / or mitigate (rec.5.3).
 - Reassess the risks addressed by the Additional Quantitative Risk Analysis (QRA) presented in RAP 2 and develop a comprehensive risk register for contingency held at sponsor level. The catastrophic risks should be listed and managed separately. The risk management plan should identify the ownership of these risks. The catastrophic and high-impact, low-probability risks, should be presented as ranges of schedule and cost impact, rather than point estimates. Remaining risks should be analysed to develop three point estimates of schedule and cost impact (rec.6.3).
- Sponsors to obtain independent assurance that CRL has ensured effective programme controls are in place to support the efficient delivery of the balance of the programme (rec. 5.4).
- Sponsors to consider the extent to which CRL has taken adequate steps to mitigate the likelihood and potential impact of a catastrophic event and whether or not potential contingent funding arrangements should be put in place to address such an event (rec 5.1).

1.7.3 CRL's funding model

We reviewed the Sponsor Funding Account (SFA) balance calculations (i.e. additional funding requirements) in CRL's RAP 2 Model. As we would expect, the calculations do not include NR ONW, full rolling stock²² or the Old Oak depot cost. Nor do they reflect the benefit of the additional £300m of funding for CRL agreed in July.

The calculations are driven by direct, indirect and risk-related capital cost assumptions (including assumed profiles over time) and other inputs such as NR financing costs, traction power works funding assumptions, working capital assumptions and cash payment profiles for some costs ([REDACTED] and insurance).

Our review focussed on the P6 2018_19 SFA balance and assumptions that drive the change in the SFA balance after that date. The Model had not yet been subjected to testing procedures by CRL to check

²¹ See section 2.6

²² Cost includes the £13 million for the Reading additional rolling stock.

formulaic integrity. CRL's Auditor Grant Thornton reviewed a previous version in March 2017, but only looked at the AFC and AFCDC calculations, rather than the SFA balance.

Our key findings include:

- The Model reflects a P50 view of cost and risk, rather than P95. We understand this is in line with PDA requirements. The Model reflects a P50 AFCDC that is similar to the £13,679m in RAP 2, except for a variance of £14m which was essentially an error and should not have been included. The P95 cost in RAP 2 amounts to £13,831m for comparison.
- The Model shows an SFA deficit at project completion of £1,180m, i.e. £880m in addition to the £300m already committed at the time the Model was produced. In comparison, RAP 2 indicates an additional funding requirement for £1,019m due to the variances mentioned above.
- There are a number of subjective / judgemental assessments related to both levels of **costs** ([REDACTED]); and assumed **timing** of cash outflows (the two period lag for accruals; timing of [REDACTED] of financing costs to be paid to [REDACTED]; timing of unwinding of the £100m ACWP to COWD adjustment; timing of unwinding of provisions of £31m²³; timing of [REDACTED]) all of which may impact the model forecast SFA cash balance at any specific period end.
- [REDACTED]
- We also identified a variance of £38m between the calculated P6 2018_19 SFA balance, from which the Model rolls forward, and the actual SFA balance. CRL advised that the difference is driven by a recent spike in accruals (i.e. costs incurred but not yet paid out). CRL noted that ten contracts account for £38m of the total £50m accruals increase.

We looked at the potential impact of the 'alternative cost assessment' (scenario 3), as described in Section 5, on the SFA cash balance from P7 2018_19 onwards. This indicates that scenario 3 would require Sponsors to make allowance for £312m of additional funding by the end of the Crossrail project, over and above the £1,019m apparent from RAP 2 (P50). Of this £312m, £73m would arise by 31 March 2019²⁴. We note that the model also shows that the cumulative cash outflows which yield £1,019m adverse to IP2 by the end of the project, show a cumulative net cash outflow of £652m by 31 March 2019, making an overall £725m²⁵ cash funding shortfall by 31 March 2019 based on the assumptions in the inputs and model, and before taking account of the £300m funding amount already agreed.

We tested the logical integrity of the arithmetical operations in the Model formulae and calculations under the assumptions and input data for the base case ('Current (P50)' scenario). Specifically, for each unique formula, we inspected the formulaic code and documented instances of apparent arithmetical inaccuracy or deviation from the intended logic²⁶.

On completion of our testing on the initial version, we issued a number of queries, some of which related to how Model assumptions were being applied, and others to the formulae logic used within the Model. We have since received an amended version of the Model ('CIM v405_CP2+ Scenario v02.xlsm') and responses to our queries. Following testing of the amended version, and assessing the responses to our queries, we have 37 points remaining. Of these, 35 are assumptions-related comments raised during our work, which may help the users' understanding of the Model, and 2 findings on the logical integrity of the Model but which do not impact the Model's ability to achieve materially the purpose which it was designed

²³ The Model also effectively assumes that the sum of £31m set aside for provisions unwinds, meaning that in effect the first £31m of the Model's remaining £223m programme contingency is already spent (unless the provision costs are not ultimately incurred). This is a timing assumption issue given that the Model includes in aggregate costs in line with RAP 2 subject to the variances highlighted in this report.

²⁴ Assuming one adopts the assumptions in the funding model around timing of cash flows

²⁵ £652m plus £73m. The balance of the cash shortfall arises after March 2019.

²⁶ "Intended logic" as implied by the Model structure and construction or as explicitly stated in the cell label or management's documented understanding of the Model.

to meet, insofar as its logical integrity under the base case assumptions and input data is concerned. These are set out at Appendix 12.

Key recommendations for consideration include:

- If Sponsors wish to make allowance in additional funding for costs to come in at the P95/Additional P95 QRA level then we recommend that the Sponsors instruct CRL to prepare a Model reflecting the full P95 costs and Additional P95 QRA, rather than P50 (rec. 8.1).
- Sponsors may wish to consider whether there is a risk that the position of the [REDACTED] in December 2016, and whether this should be reflected in the cost assumptions in a future Model version (rec. 8.3).
- There are a number of subjective assessments related to both costs and timing of cash outflows which may impact the SFA cash balance. To increase the robustness and level of confidence in these assumptions, we recommend that Sponsors should request CRL to develop these assumptions further (rec. 8.4).
- Sponsors should consider whether the assumption on the timing of unwinding the sum set aside for provision for disputed sums is appropriate (rec.8.5).

Finally to reflect the potential impact of the issues highlighted in this report, Sponsors should consider asking CRL to Model the higher levels of costs which were illustratively assumed by the various scenarios explored in Section 5. It would be sensible to have regard both to scenario 3 representing roughly the mid-point of the assumptions explored as well scenario 6 representing the most pessimistic scenario. Together with the adoption of appropriate assumptions as to timing of cash flows, this would enable Sponsors to have a view of the impact of those scenarios over time.

1.7.4 Financial controls

Our review, described in Section 9, was carried out under the four headings of people, processes, financial reporting and assurance. Our key findings and critical recommendations for consideration are outlined below.

Key findings include:

The headcount reduction in CRL's finance department due to the planned demobilisation has led to some weaknesses in financial processes and controls.

CRL's financial controls as operated are in need of some improvement in order to be aligned with good practice:

- CRL's finance department currently has insufficient resources to ensure effective financial control until the completion of the programme; in particular it has not been providing sufficient constructive challenge to commercial forecasting and reporting
- Discussion with management indicated that the headcount reduction in the finance department due to planned demobilisation has reduced the interface by the project accountants with the project delivery teams, which will have sharply diminished discussion and review of areas such as nature and value of COWD accruals, level of open purchase orders and authorisation of purchase order uplifts as well as reducing more generally constructive challenge of commercial forecasts
- There is no consolidated finance procedures manual
- During our fieldwork we were told that CRL did not intend to prepare a business plan for 2019_20
- The CRL Audit Committee met for the last time in June 2018 and was in effect disbanded in July 2018. Proposals for revised arrangements relating to Audit Committee matters were approved by the CRL Board in July 2018 (further details can be found at Section 12.4.3). The coverage provided by internal assurance is too narrow and fails to adequately address commercial and financial controls

- CRL does not currently have a head of risk with an overall responsibility for both programme risks and corporate risks.

Critical recommendations for consideration include:

- Streamline the content of CRL Board Reports; add additional metrics to report on actual productivity at a contract level (for key contracts) over time with comparison against plan, and assumptions underpinning costs and time to go calculations so as to provide transparency on past, current, and future assumed productivity for each key contract (rec. 9.1).
- Revise the current demobilisation plan to align with a realistic assessment of the probable programme timeline; appoint resources needed to sustain effective control through the balance of the programme (rec. 9.2).
- Produce guidance on the appropriate extent, areas, frequency and processes which project finance staff and others in finance should follow to ensure there is sufficient constructive challenge to key commercial / project activities (rec. 9.3).
- Prepare a tailored business plan for the 2019_20 financial year suitable for supporting the effective execution of the business' objectives (rec. 9.6).

1.7.5 Commercial reporting, oversight, controls and processes

CRL performance monitoring and reporting has not led to timely / adequate²⁷ advance notice being provided of the need to materially change the Stage 3 opening date and the resulting significant cost impact.

Cost scenarios prepared by CRL at Sponsors' request and tabled at the March 2018 SB, critically did not take account of the potential impact of any material irrecoverable delays in infrastructure works which had a much more substantial cost run rate than the issues addressed in the scenarios²⁸.

Effective reporting of programme status relies inter alia on:

- Effective contract management, monitoring and oversight by contractors of their supply chains; of contractors and supply chains by CRL; and on
- Effective reporting systems and flows of information up through CRL from project and commercial teams, through to management, on to EIC, and then to the CRL Board and thereafter to Sponsors.

The resultant reporting within and by CRL was neither sufficiently timely nor sufficiently clear as to the impacts and magnitude of the range of probable consequences of the issues within the programme.

CRL management explained to us that its understanding of the project costs and timeline as reported through the project management teams and systems was evolving and changing at pace during the first half of 2018. It is also explained that there were many challenges to schedule and milestones and that a

²⁷ "adequacy" when assessed in the context of the length of the Crossrail programme and the magnitude of changes to forecast time and cost outturn recently announced

²⁸ Scenario A (with 3 different options) assumed no delay to Stage 3 opening but with the potential need to accelerate. Scenario B considered 3 different delay options but in all cases assumed that all infrastructure works would still be finished as planned and that delay would arise during systems or dynamic or software testing or due to the lack of a viable train. Allowance was made for around [REDACTED] month costs for maintenance, upkeep and safe operation of the infrastructure in the event of a prolonged train control and/or system operating delay. A [REDACTED] delay scenario assumed delay due to a serious event that caused wholesale re-programming. We note that Jacobs' Cost Scenario Report of June 2018 reported that at a meeting with the Joint Sponsor Team (JST) in March 2018, CRL had stated that it felt the book-ends of the cost projections lay between Scenario A, Range 2 and Scenario B, Range: 3 month delay, equating to a £200m to £300m increase in cost above IP2 at P50.

variety of actions were being taken to address the challenges identified. It is evident that there were formal discussions²⁹ taking place between CRL and Sponsors around these matters.

Evidence of formal discussions around these matters is apparent from, for example, the minutes of the June 2018 SB which record that Sponsors asked CRL to provide information for the next checkpoint (in effect the July SB) on: confidence in December delivery, alternative options to December, including a delayed opening or a reduced frequency or partial opening. We note that a document entitled “Stages 2-5 Readiness” dated 25 June 2018 and tabled by CRL at the June SB showed the Stage 3 opening date of 9 December as “Green” with no variance against a 9 December 2018 opening date although a significant number of the preceding Stage 3 milestones and activities were clearly shown as red or amber as shown in Table 1:

Table 1: Stages 2-5 Readiness Milestone / Activities

Milestone / Activity	Green	Amber	Red
Dynamic Testing	4	1	3
Pre-Trial Running	4	2	3
Combined Elizabeth line trials	1	4	0
Passenger Service	5	0	0
LU and RfLI Stations – Staged Completion for familiarisation and Trial Ops	7	1	0
Infrastructure, Trains and Testing	0	2	4
MTR, NR, LU and RFLI readiness	0	4	1

It is also evident that there was regular reporting each period on forecast cost outturn and timeline inter alia in the CRL Board reports during 2018³⁰ and in Project Representative (P Rep) reports³¹. We have based our comments and recommendations on what is recorded in the papers and documents that we have reviewed including the formal minutes of meetings.

It is clear from the reporting of CRL and of the P Rep that a large volume of work was being undertaken to mitigate delays, re-sequence works and search for alternative approaches to testing and commissioning to maintain the opening date. A feature of the increasing stretch or optimism however was a failure to identify, and / or report on a timely basis, the point at which it became unrealistic to expect all remaining activities to

²⁹ During the course of confirming factual accuracy of this report with CRL we were advised that there had also been informal discussions. No details were provided and it was outside of our Terms of Reference to investigate whether and, if so, what informal discussions had occurred.

³⁰ We note in this regard that the Crossrail Cost Scenario Review report prepared by Jacobs and dated 19 June 2018³⁰ stated: “In early March 2018 CRL presented to JST its document entitled AFDCD Scenarios whereby it proposed two scenarios and developed costs for three options within those scenarios, in order to establish and describe an estimated upper and lower limit of funding requirements (known as the ‘book-ends’). During this meeting CRL stated that it felt the book-ends of the cost projections lay between Scenario A, Range 2 and Scenario B, Range 3 month delay, equating to a £200m to £300m increase in cost above IP2 at P50.”

We note the CRL Board Report for period 4 2018_19 [24 June to 21 July 2018] shared with Sponsors addressed “Are we on time” inter alia as follows:

“Overall delivery is 94.4% complete vs. planned of 96.3%. 0.6% was achieved in the Period against the plan of 0.7%. Work remains ongoing to evaluate the impact of schedule delays to critical path activities on Stage 3. Alternative scenarios have been identified and communicated, with an executive review planned in Period 5. The drive to complete all physical works and handover each element to the IMs in accordance with the agreed stage completion dates remains resolute.”

The same CRL Board Report commented overall: “Steady but vital progress continues to be made across the project, but in order to mitigate further schedule slippage, each contract is working on detailed plans to demonstrate the steps they are taking towards handing over their sites to the IMs. Despite this, significant overall schedule pressures exist across the programme and work remains ongoing at a project level to identify and evaluate the impact of schedule delays on critical path activities ahead of Stage 3. Alternative scenarios have been developed with Executive, Board and Sponsor reviews planned in August and September to discuss the schedule pressures and proposals for a revised delivery strategy. The drive to complete all physical works and handover of each element to the IMs in accordance with agreed stage completion dates remains resolute as this is key in minimising further cost growth.

Overall, the project has now reached 94.4% complete. In the Period, the AFDCD remained unchanged at £12,810m (£297m above IP2). In the next few weeks, further defined-cost reviews will be held with key contracts in our ongoing review of emerging costs and additional cost increases in light of schedule pressures. These increases are in the process of validation ahead of being reported next Period.”

³¹ The role of P Rep is performed by Jacobs. See Governance report Appendix 5 for example relevant extracts from P Rep reports during March to August 2018.

be completed within the diminishing timeframe for planned Stage 3 opening and which should have led to revised expectations as to time and cost outturn being developed and reported.

More generally, we consider there was insufficient information in CRL Board reports (i) around actual and likely performance of individual contracts and related integration activities to enable an accurate and sufficient understanding of their likely outturn and impact on the programme; and (ii) of useful trend and other analysis to enable an adequate understanding of historic performance against plan in the context of assessing forecast cost and time to completion.

Finally we note that since 2017 the CRL risk management process has been split between the site teams who perform qualitative risk assessments (previously they also performed detailed quantitative assessments) and the central management risk team which now performs the quantitative analysis across the project. The latter has been reduced to two people as part of the demobilisation plans aligned to a Stage 3 December 2018 opening.

1.7.6 Remainder of the project – CRL reporting

Sponsors should remain accountable for the successful delivery of the whole Crossrail programme, (to a timescale that has yet to be determined and a budget that is heavily dependent on the time to complete the infrastructure works) with CRL in turn held responsible for the successful integration and delivery to an agreed timeline and budget (Governance Report 4.1). It will be critical for the Sponsors to satisfy themselves around the development of the delivery plans with associated estimates of time, cost, risk and assessment of scope adjustments required to open the Elizabeth line as early as practicable (rec. 11.1).

Once the plan is agreed, the Sponsors and CRL will both need to establish adequate controls, reporting and assurance that the programme is on track or that adequate action is taken at the appropriate time to maintain progress within budget.

Critical recommendations during the initial planning phase include:

- Establish the reserved matters that require CRL to seek Sponsor approval (rec. 10.2).
- Agree timescales for the development of the initial programme by the new CRL CEO and then the development of that programme (rec. 11.5, 11.6).
- Obtain independent assurance of the CRL programme with a deep dive into the estimates for time and cost and providing scenarios based on various scope and other options (rec. 11.5).
- Review the funding envelope and define the process for the timing and release of additional funding against identified risks (rec. 10.1).

Critical recommendations after the agreement of the initial programme include:

- Agree the critical milestones that provide the Sponsors with a transparent view of performance (rec. 10.3).
- Define the method for obtaining assurance that CRL reporting is sufficient, accurate and transparent (Exec 1³²).
- Agree the metrics and analysis required from CRL in its performance reporting to allow the Sponsors to make their own assessment of whether the progress being achieved is in line with the plan (rec. 11.2, 11.7).
- Define what Sponsors wish to receive from CRL in the form of variance analysis and a summary of mitigation actions where performance achieved is behind that planned (10.3)

³² Recommendations which only appear in the Executive Summary are in table 2 within Section 1.8.3

1.7.7 CRL Board Committees

Trust between Sponsors and the CRL Board has been undermined by reporting that did not sufficiently surface the probable impact of or the magnitude of the emerging performance issues soon enough.

The CRL Board has been through a period of extensive change. A majority of its membership has changed during 2018, including individuals performing the role of Chair and CEO³³.

Our recommendations consider the further skills and experience which would augment the current CRL Board given the nature of the remaining phases of the project, and also address the roles of the Committees of the Board.

The CRL Board continued, until relatively recently, to pursue a pre-planned demobilisation of central resources around a December 2018 Stage 3 opening. This included disbanding the CRL Audit Committee in effect in July 2018 and re-allocation of its responsibilities (further details can be found at Section 12.4.3).

There was a much reduced level of internal audit coverage in 2017_18 and 2018_19, with insufficient coverage in particular in the critical areas of finance and commercial controls.

Demobilisation reduced central risk oversight and central reporting around commercial and financial risks although CRL considers it did not impact risk management and mitigation at a project level as demobilisation was only focussed on central resources.

Critical recommendations for consideration in relation to CRL Board Committees include:

- Sponsors should work with CRL to enhance the capabilities and expertise of the CRL Board through the nomination of new Non-Executive Directors (NEDs) with expertise matched to the current and future requirements of the programme (rec. 12.6).
- CRL to recognise that greater openness and transparency with Sponsors and timely communication of relevant information is required to reflect the changed circumstances of the project and to set out to Sponsors how CRL will cascade enhanced expectations regarding behaviours, transparency, and culture throughout its organisation (rec. 12.1).
- CRL to re-establish the CRL Audit Committee and Risk Sub-Committee as a single combined Committee (the Audit and Risk Committee). The remit of the Audit and Risk Committee should be consistent with standard good practice for an organisation such as Crossrail (rec. 12.2).
- The breadth, resources and focus of CRL's internal assurance programme should be enhanced so that there is sufficient focus on project delivery and corporate risks, internal financial and commercial controls and on reporting (rec. 12.2).
- With regard to the reporting of risk we recommend consideration is given to more frequent reporting to EIC, to introducing reporting to the CRL Audit and Risk Committee once formed³⁴, to re-assessing the sufficiency of central risk resources and to reinstating risk quantification at project level (rec. 12.2).

³³ In the period since March 2018, all three individuals performing the role of Executive Director have changed. There has also been change to CRL NEDs. In April 2018 there were six NEDs, as of December 2018 there were five NEDs. One of the existing NEDs has become the CEO. Three former NEDs reached the end of their terms of office in June 2018, these three individuals were replaced by three new NEDs, appointed in July 2018.

³⁴ The Audit and Risk Committee should be formed as soon as possible.

1.8 Moving forwards

1.8.1 Addressing the issues

We have set out above and through this report, and in our other report on governance arrangements, a number of recommendations for consideration to address the issues identified.

We have noted that the issues we have highlighted need to be addressed at pace if Sponsors and CRL are to give themselves a good chance of managing the completion of the programme within the cost envelope announced on 10 December 2018.

There will still be significant challenges to be faced in completing the infrastructure works, the routeway, systems, signalling and systems integration and dynamic testing and then in commissioning.

Addressing the issues highlighted in this report and in the separate governance report will mean that the Sponsors and the project will be better placed to identify challenges in a timely way, will have the right expertise on hand, will have better visibility of performance and emerging commercial issues and will be able to deal with challenges promptly. Improvements to reporting and programme sponsorship etc. will not in themselves make the difficulties of completing the project go away, but they will facilitate early visibility of issues and identification of the right actions and interventions, enable transparency and provide an environment in which the complexities of completing this project successfully have a much enhanced chance of being overcome more smoothly.

1.8.2 Early visibility of emerging critical issues and recommendations

An early outline for consideration by Sponsors of issues and our critical recommendations emerging from completing the fieldwork in addressing both Terms of Reference, was shared with Sponsors at the 15 November 2018 SB. At Sponsors' request we then supported Sponsors in sharing the critical recommendations relevant to CRL with members of the CRL Executive on 22 November 2018. This was so as to provide a basis for CRL's early consideration of the identified issues and to allow CRL to accelerate actions in response, given our strong recommendation to Sponsors that both Sponsors and CRL taking the right actions at pace to address the issues identified was critical to constraining project outturn costs. The issues discussed on 22 November 2018 with members of the CRL Executive which were relevant to this report were as set out below.

- Developing a robust updated MOHS
- Developing a robust updated cost estimate
- Improving CRL reporting including enhancing metrics, setting milestones for reporting against and establishing early warning reporting
- Resourcing – identifying and addressing central resource gaps
- Enhancing certain management controls and re-setting financial controls
- Defining, assessing and approving commercial strategy
- Driving contractor performance
- Reinforcing culture and cascading enhanced expectations around openness in reporting throughout the project and avoiding optimism bias
- Addressing the identified issues from our reviews and the related practical day to day management steps recommended to oversee timely implementation
- Strengthening three lines of defence including broadening internal assurance coverage of commercial and financial matters
- Establishing the Audit and Risk Committee

1.8.3 Remainder of the project – CRL reporting, addressing our recommendations, and related Sponsor Assurance

Sponsors will face significant challenges, going forwards, in assessing CRL reporting and related Sponsor Assurance, and in implementing our recommendations. In particular key challenges will include Sponsors' need to assess;

- Whether the pace of change in the nature, quality and extent of CRL reporting is providing sufficient transparency and a realistic assessment of progress and forecast outturn as to time and cost; and
- The extent to which the recommendations in this report and the related governance report have been implemented and whether the manner and pace of their implementation by Sponsors and CRL is sufficiently addressing the underlying issues they were designed to address. This will be particularly challenging given the relatively short amount of time within which some of these matters need to be implemented. This, together with the pace of the programme, may therefore necessitate, with Sponsor agreement, the application of judgement in some instances as to the sensible degree of pragmatism which should be applied when determining the design of what should be implemented.

We have therefore recommended that Sponsors:

- Seek independent advice on these matters (Exec 1).
- Create an action plan and ensure CRL creates their own action plan using a similar overall design, to be agreed with Sponsors (Exec 2).
- Develop an approach to the oversight and monitoring of the implementation of the consolidated action plans (Exec 2).

Table 2: Executive Summary Recommendations

EXECUTIVE SUMMARY RECOMMENDATIONS	
Exec 1	<p>Sponsors to define the method for obtaining assurance that CRL reporting is sufficient, accurate and transparent.</p> <p>Sponsors to consider obtaining regular and independent advice which enables them:</p> <ul style="list-style-type: none"> • To judge whether P Rep’s current remit and outputs are providing sufficient assurance to Sponsors across the full range of programme challenges or whether additional steps are required to assess and consider the information being received in relation to the programme; • To assess whether the pace of change in the nature, quality, and extent of, CRL reporting around programme progress, forecast cost outturn and key risks is likely to provide sufficient transparency of programme status, likely outturn, and key risks net of mitigating actions being taken. In particular whether the metrics being reported are sufficiently reliable and tailored to the differing needs of construction, systems and integration etc activities to provide sufficient visibility of current and expected performance and outturn; • To assess periodically and more deeply (for example at pre-defined stages) if project status and likely cost and time outturn broadly aligns with that being reported; • To assess whether the shape and pace of addressing the issues highlighted by / implementing the recommendations in this independent report on the review of financial and commercial matters and in the related report on governance arrangements, is progressing as it ought and whether the actual steps being taken are sufficiently addressing the underlying issues.
Exec 2	<p>Sponsors to draw up an action plan comprising the recommendations for Sponsors set out in this and the related governance report. Agree and record within the action plan, the actions to be taken, prioritisation, timelines, and responsible individuals.</p> <p>Define the extent of progress which Sponsors wish to see achieved from their own and CRL actions, by pre-set milestone dates in each of the critical priority areas, such as in the case of CRL, creation of a sufficient schedule, enhancing CRL reporting etc</p> <p>Define the means by which assessment will be made of the progress in implementing Sponsor and CRL actions and of the extent to which each underlying objective has been achieved. Define how these matters will be independently assured, and to whom and how frequently the implementation progress and results of the independent assurance will be reported.</p> <p>Agree with CRL an appropriate set of arrangements including initial agreement between Sponsors and CRL of the actions proposed to be taken by CRL and by when, arrangements for period visibility of a copy of the CRL action plan updated for progress in closing agreed actions and the results of CRL’s own regular monitoring, assessment and independent assurance of the implementation and impact of the actions.</p> <p>The initial agreement between Sponsors and CRL of actions to be taken will need careful consideration by Sponsors of:</p> <ul style="list-style-type: none"> • The prioritisation sequence proposed by CRL • The timeline proposed for implementation • How satisfactory completion of an action is proposed by CRL to be established • Where CRL concludes that the approach to addressing an issue needs to be varied from that outlined in a recommendation so as to enable more rapid addressing of the underlying issue, then Sponsors will need to satisfy themselves that the changed approach will be sufficient to address the underlying issue highlighted <p>Define how, how often and by whom, the rolled up action plan (Sponsors’ and CRL actions plans combined) will be reviewed and the means by which resulting required actions will be communicated and in turn followed up.</p>

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