

Project Representative Report

**Item: Project Status Report 163 and Crossrail Response
Period 1 FY2022-23**

Date: Period 1 (2 April 2022 - 29 April 2022)

1 Overview

- 1.1 The P-Rep is in place to provide the Sponsors, TfL and the Department for Transport, with oversight of project delivery, advise and raise points of challenge to the Sponsors and scrutinise progress.
- 1.2 The P-Rep observations are shared with Crossrail and are discussed in detail by Crossrail, P-Rep and the Commissioner. Crossrail then produces a written response to the P-Rep report.
- 1.3 In line with the commitments made by the Mayor for greater transparency of the Crossrail project, please find below the latest P-Rep Sponsor Summary and Crossrail's Management Response.
- 1.4 It has been necessary to make some redactions to the reports prior to publication to protect commercially sensitive material. We have sought to keep such redactions to a minimum

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Appendix – CRL Response to Period 1 PRep Report

Programme Response Category	PRep Period 1 Sponsor Summary Content	CRL Period 1 Response
<p>Headlines: Progress and Look Ahead</p>	<p>CRL and RfLI have committed to open Stage 3a of the Elizabeth Line on 24 May 2022¹.</p> <p>Period 1 was characterised by minimal site completion activity and the prioritisation of Timetable Demonstrations in order to grow operational familiarity and overall railway reliability. The impact of this approach has been an improvement in the service performance measures, which is expected to have positively influenced the passenger service commitment decision.</p> <p>With CRL working to complete the last few EOWLs, the main focus in the period has been the closure of the remaining SJ Dependency for London Fire Brigade (LFB) communications.</p> <div style="background-color: black; width: 100%; height: 150px; margin: 10px 0;"></div> <p>The LFB has issued a Letter of No Objection (LONO) allowing the Dependency to be closed, and this is being reflected in the final top level safety assurance documentation being prepared for ITAP submission. Additional ITAP meetings have been scheduled to accommodate the workload associated with final review and formal safety acceptance².</p>	<p>Stage 3A opened for Revenue Service as planned on 24 May 2022.</p> <p>Agree.</p> <p>Agree. Also, safety assurance sign-off through general ITAP was achieved a week ahead of Revenue Service.</p>

Appendix – CRL Response to Period 1 PRep Report

	<p>The installation of ELR200 signalling software in the Easter 2022 Blockade delivered the anticipated improvements in system reliability and allowed the removal of a large number of Operational Restrictions. While a few regression issues have since been identified and largely rectified by CRL, a small number are still to be addressed shortly after passenger service opening. Issues with signalling Auto-Transition functionality at the GEML interface have continued to be investigated with additional testing undertaken, but the measures have not been completely successful and the trackside balises have been reverted to support manual transition. While this is not an issue for Stage 3 opening, an acceptable mitigation or permanent fix must be implemented prior to Stage 5B opening.</p> <p>RfLI has continued with Timetable Demonstrations to embed learning, improve reliability and reduce fix times for delays. While some days have been lost to priority LFB rectification works, reliability improvement is evident. However, a range of issues continue to be monitored, such as GSM-R, PSDs, train specific issues and Under-Platform Extractors (which affect PSD operation); solutions to these are being implemented where possible. The introduction of passengers to the railway is likely to reduce overall reliability performance after Stage 3 opening because of interaction with railway systems. A resilience response plan will be implemented by RfLI in the early weeks of</p>	<p>Siemens have identified three interventions to increase the resilience of the transmission of information from the train to the signalling system at Stratford. These will be implemented weekend of the ██████████ June 2022, tested on ██████████ June and report written by ██████████ June. As a result, this has delayed the ██████████ no go decision point to the ██████████ June, which results in a timetable implementation date for 5b minus (22 tph) of ██████████ 2022. MTR have developed and agreed a manual transmission process to be implemented for Stage 5b minus only. A further timer fix is included in ELR300 which will be commissioned at Christmas 2022. This will allow the implementation of auto transition and the Stage 5b timetable in early ██████████ 2023.</p> <p>Agree.</p>
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Appendix – CRL Response to Period 1 PRep Report

	<p>service to deal with potential eventualities and to ensure that any impact upon reliability is minimised. A 20 TPH trial was completed in early May 2022, which demonstrated Stage 5B Minus service operation.</p> <p>With railway opening now scheduled for 24 May 2022, the remainder of the CRL organisation will merge into RfLI at the end of May 2022, with RfLI becoming fully responsible for the delivery of remaining works and operation of the railway. Some senior management staff from CRL will remain with RfLI, together with a sizeable number from CRL’s technical team. This approach will support knowledge transfer and provide resilience to the delivery of outstanding works. The prolongation risk associated with the completion of the final opening stages may result in additional Indirect resource costs.</p> <p>The opening of Stage 3 passenger service will mark a significant milestone in the delivery of the Elizabeth Line; however, important scope items remain beyond Stage 3 opening. Fire stopping and fire suppression works are outstanding at Bond Street Station, with opening targeting [REDACTED] 2022.</p> <p>CRL and RfLI continue to work to an earliest start to Stage 5B Minus services. DCS v1.3 development for the end-to-end railway (including Stages 5B and 5C) continues, with a number of workstreams nearing completion. These include: GEML interface signalling transition; Auto-Reverse functionality; signalling software (ELR210); train software (H5.73);</p>	<p>The remainder of the CRL organisation will continue to work closely with RfLI with RfLI being responsible for the operation of the railway. CRL remains responsible for the delivery of remaining works with some aspects transitioning to RfLI. Some key CRL resources will continue to support RfLI including a smaller, appropriately sized technical team.</p> <p>Agree. However, Bond Street station is not a requirement for Stage 5B Minus; 22 TPH can still run without having Bond Street station open. Following extensive consultation in the DCS 1.3 weekly reviews, a key set of assumptions have been agreed to hold the earliest start target date for Stage 5b minus (currently it is [REDACTED] 2022).</p>
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Appendix – CRL Response to Period 1 PRep Report

	reliability growth; PSDs, Bond Street Station; timetable readiness; communications and control systems upgrade; maintenance backlog reduction; access requirements; and Plumstead alternate power ³	
Health & Safety	No incidents or accidents were reported from CRL's construction related activities in Period 1. RfLI reported one operational incident, which is under investigation. Work sites are being progressively reduced in size and number and CRL's reported safety statistics remain representative of site activities and are within the parameters set by the Programme.	Agree. However, there were a number of minor incidents recorded in the period.
Programme Overview: Schedule	Risks remain with many unresolved scope items which are being evaluated in the development of DCS v1.3; these scope items are set out in Section 1.1. Completion of DCS v1.3 development is expected by the end of Period 2 for Stage 5B Minus, and by the end of Period 3 for Stages 5B and 5C.	Agree.

Appendix – CRL Response to Period 1 PRep Report

<p>Commercial and Risk</p>	<p>At Period 1, CRL is reporting no change from its Period 13 forecast; the P50 AFCDC remains at £15.963m and the corresponding [REDACTED]. The Period 1 draft P50 AFCDC is £[REDACTED] above the current £825m funding threshold and £[REDACTED] under the £1.1bn funding limit. Spend in the period was £[REDACTED] (£[REDACTED] lower than forecast) and is expected to reduce to £[REDACTED] for next period; COWD to Period 1 is £[REDACTED].</p> <p>The AFCDC continues to remain stable, with CRL demonstrating containment of costs and identifying tangible cost reductions. CRL drawdown on its contingency was nominal, at approximately £[REDACTED]. However, the net impact of increases without identified offset and reductions has resulted in an increase of £[REDACTED] transferred to the CRL Programme Reserve.</p> <p>We expect the confidence in, and increased certainty of, Stage 3a opening on 24 May 2022, to reduce related risks and underpin the known and identified residual risks reported elsewhere in this report. Consequently, CRL and RfLI will focus on the delivery of Stages 5B Minus, 5B and 5C, which will effectively become a £[REDACTED] project with £[REDACTED] CTG and £[REDACTED] contingency.</p> <p>CRL has carried out an update to the QSRA in the period as part of DCS v1.3 development, drawing on the existing QSRA and using inputs from the Operations, Signalling and Residual</p>	<p>Agree, except for the latest Period 2 forecast being £[REDACTED] as opposed to the £[REDACTED] noted, which was based on the Route Home forecast, done in Period 6 FY2021/22</p> <p>Agree, but to be clear, the £[REDACTED] was an upside retained and transferred as an increase to the CRL Programme Reserve.</p> <p>Note.</p> <p>Agree.</p>
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Appendix – CRL Response to Period 1 PRep Report

	<p>Works Teams. A Risk Workshop for Stage 5B Minus was held on [REDACTED] April 2022 and for Stage 5B on [REDACTED] May 2022. CRL will be reviewing and updating the risks identified from the QSRA during May 2022 as part of the DCS v1.3 update. Level 1 Programme Risks are currently unchanged from those reported to ELDG in Period 13, with reviews planned during May 2022. We expect that Level 1 Programme Risks will be replaced with Elizabeth Line Operations Risks after the start of Stage 3 passenger service.</p> <p>As a result of changes made to the management of risk and contingency, CRL has not undertaken a Programme QCRA this period. The key areas of cost exposure reported by Projects in the PDRs over and above budget submissions made at Period 11 imply that there is a potential approximately £[REDACTED] additional exposure which may need to be covered by Programme contingency. The QSRA is presently unchanged from Period 12, implying a potential approximately £[REDACTED] additional exposure arising from prolongation of Stages 5B Minus, 5B and 5C.</p> <p>These emerging risk costs might be drawn from the current £[REDACTED] contingency provision adding further pressure to CRL's ability to outturn to the £825m funding limit. It is therefore likely that CRL will outturn close to its P50 AFCD which continues to be below the £[REDACTED] funding request limit.</p>	<p>Note.</p> <p>With the possibility emerging risk cost could be drawn down from our contingency provision, the Programme continues to try to deliver as close as possible to the £825m funding envelope and minimise further requirements.</p>
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Appendix – CRL Response to Period 1 PRep Report

<p>Organisation</p>	<p>With CRL and RfLI now committed to passenger service opening on 24 May 2022, there is expected to be some further demobilisation of CRL staff at the end of May 2022; however, the majority of the departures will take place in [REDACTED] 2022. This is in line with demobilisation plans for the Programme, and the completion of responsibility transfer to RfLI for the railway and for the opening of the follow-on stages. Some of CRL's key resources will remain for the foreseeable future, together with a sizeable technical team to support RfLI in securing Stage 5 opening.</p> <p>The only station site that has substantial resources engaged is Bond Street Station; this is expected to continue until at least [REDACTED] 2022.</p>	<p>CRL agrees with the Project Representative, however, a small number of CRL's key resources will remain, together with a smaller, appropriately sized technical team to provide support to RfLI in securing Stage 5 opening.</p> <p>Works at Bond Street station are expected to continue until Autumn 2022.</p>
<p>Stage 3, Timetable Demonstrations and Passenger Service</p>	<p>The Timetable Demonstration period has generally proceeded as planned, with intrusive works and exercises kept to a minimum, and only taking place when critical to Stage 3 delivery. This has created a more stable railway operating environment than in Trial Operations, with sustained improved reliability performance, and the occasional achievement of PPM levels in excess of [REDACTED]. During Trial Operations, the average PPM was [REDACTED] which has risen to approximately [REDACTED]⁷ during the Timetable Demonstrations, with an improving trend. The metric 'delays greater than 15 minutes' is also</p>	<p>Agree, relative to the time period that the report covers.</p>

Appendix – CRL Response to Period 1 PRep Report

	<p>improving, with an average of [REDACTED] per day during the Timetable Demonstrations; the target is 0.5. However, the thresholds set for passenger service have not yet been met, and it is reasonable to expect performance to initially fall in the early stages because of passenger interaction with the railway systems, particularly the PSDs.</p> <p>RfLI intends to mitigate the initial impact of passengers upon performance by implementing a number of resilience measures. These include preventing passenger access until approximately an hour after trains have entered service in the mornings, allowing the operator time to manage any service start-up issues; having additional operational and technical staff located at strategic points around the network; and allocating poor performing trains to non-Stage 3 services. RfLI and MTREL are likely to adapt their processes and procedures as it learns how the railway behaves in service.</p> <p>The commitment to passenger service was made at a Go/No Go review on [REDACTED] May 2022, when it was determined that ongoing performance improvement would allow a sufficiently reliable passenger service to operate from 24 May 2022. The decision would have acknowledged the further reliability improvements anticipated from the deployment of train software H5.7, from early May 2022 onwards.</p>	<p>Agree.</p> <p>Agree. On 24 May 2022, the Central Section of the Elizabeth line commenced passenger operations delivering 97.9% PPM for the week ending 28 May 2022 (Period 2, Week 4), with over one million passenger journeys recorded. Overall, this represents a very strong first week of passenger service in the Central Operating Section with zero accidents or significant incidents reported during this time.</p>
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Appendix – CRL Response to Period 1 PRep Report

<p>Stations Commissioning and Handover</p>	<p>While CRL has declared that Canary Wharf Station is now ready for passenger service, completion of asset data delivery is outstanding. The processing and upload of asset data to RfLI systems for review is not expected to be completed until after Stage 3 opening, so contractor support as the MoBo is necessary. This requirement is forecast up to the end of [REDACTED] 2022, with full handover completion to RfLI shortly thereafter: ECHC documentation will be completed in [REDACTED] 2022.</p> <p>Back-of-house safety screens were completed at Whitechapel Station, ahead of passenger service opening. Replacement of escalator skirt lighting on all stations is likely to require an extended programme of works with additional costs, but this does not prevent entry into passenger service.</p> <p>The Bond Street Station team continues to work towards a deterministic target for station opening in [REDACTED] 2022; the team has a stretch target for completion by [REDACTED] 2022, but challenges remain. Access for LFB communications installation and testing has been prioritised over station completion works. This is likely to impact the remaining fire stopping and suppression works which were scheduled for completion by the end of May 2022.</p> <p>CRL is finalising formal contract close-out for Liverpool Street and Paddington Stations.</p>	<p>ECHC is now forecast for [REDACTED] 2022 with MoBo end date scheduled just before Handover (ECHC).</p> <p>Noted.</p> <p>As mentioned above, the deterministic date for opening Bond Street station is Autumn 2022.</p>
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Appendix – CRL Response to Period 1 PRep Report

<p>Assurance</p>	<p>The LFB has accepted CRL’s solution [REDACTED] removing the last significant technical issue to assuring the railway; this allowed ORR approval of the final Technical File. ITAP has continued to support CRL and RfLI safety assurance demands in the period. Updating of the top-level submissions for entry into passenger service, by CRL and RfLI, was targeting ITAP acceptance on the Stage 3a Revenue Service Assured milestone date of [REDACTED] May 2022⁸.</p>	<p>Agree and safety assurance sign-off through general ITAP was achieved a week ahead of Passenger Service.</p>
<p>Future Stages – Stage 5</p>	<p>The forecast milestones for Stage 5 implementation are set out in Figure 2 - 1.</p> <p>The CRL and RfLI commitment to opening Stage 3 on 24 May 2022 has affected the deterministic date for implementing Stage 5B Minus, which is now scheduled for [REDACTED] October 2022. This is because the previous Stage 5B Minus decision point fell on [REDACTED] May 2022, and RfLI wanted to ensure that the period from the end of May 2022 to early June 2022 was clear for all personnel to prioritise pre- and post-Stage 3a opening activities; it is now scheduled for [REDACTED] June 2022. The decision will be driven by whether the railway is capable of delivering a reliable and maintainable service. RfLI has now established a draft list of opening criteria for Stage 5B Minus.</p>	<p>Agree.</p>

Appendix – CRL Response to Period 1 PRep Report

	<p>There will be some passenger service experience to draw upon by the time of the decision point in June 2022 and RfLI has already carried out one of six Stage 5B Minus demonstrations. This demonstration was successful, but more work is required to assess the resilience of the timetable when under pressure. Planned train (H5.73) and signalling (ELR210) software upgrades are necessary, in conjunction with process improvements, to lift performance before the opening of Stage 5B Minus. Software upgrade development is currently on schedule ahead of deployment by [REDACTED] 2022; this is an improvement upon the previous target of early [REDACTED] 2022 reported last period; however, there is almost no project float left and little time remains to assess and address any regressions that may emerge. A further programme of process improvements is likely to be required after Stage 5B Minus opens, when the Central Section services run onto the GE and GWMLs.</p> <p>[REDACTED]</p>	<p>Agree and to note that the software upgrade development referred to by the Project Representative is for Stage 5B in the delivery of auto reverse (H5.10/ELR220).</p> <p>Siemens have implemented a number of fixes onto the railway as part of ELR201 to improve the transition, and to enable consistent operation of the manual transition. This is in support of 5b Minus in [REDACTED] 2022. The fixes to support automatic transition are currently planned for implementation during the commissioning in December as part of ELR300.</p>
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Appendix – CRL Response to Period 1 PRep Report

	<p>[REDACTED]</p> <p>MTREL has been requested by RfLI to identify operational mitigations, which will need to be assessed against likely increases in operational workload and impacts upon service performance.</p> <p>The decision to proceed with Stage 5B on [REDACTED] 2022 will need to be made by late [REDACTED] 2022, when NR must be advised what service pattern will be introduced in the new [REDACTED] 2022 timetable. The availability of Auto-Reverse functionality at Westbourne Park and the delivery of system reliability remains two main areas of concern.</p> <p>Implementation of Auto-Reverse will require the prior delivery of infrastructure works, train software and signalling CBTC software changes. The schedule for delivery of infrastructure works, as currently scoped, is understood to have improved from [REDACTED] 2023, reported last period, to [REDACTED] 2023. The [REDACTED] date is [REDACTED] after the scheduled start to Stage 5B services. CRL intended to work with the ORR to establish if temporary measures (e.g. motion detectors) could be applied in the short term. However, CRL and RfLI are now doubting that the temporary mitigations could be installed and approved any quicker than the permanent measures.</p>	<p>Agree.</p> <p>Agree.</p> <p>Agree.</p>
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Appendix – CRL Response to Period 1 PRep Report

	<p>Assessment of whether service reliability is adequate for Stage 5B may be more straightforward than for Stage 5B Minus, as there is expected to be approximately [REDACTED] of Stage 3 passenger operations data available, together with the outputs from three or four 24 TPH service demonstrations. [REDACTED]</p> <p>Current modelling of Stage 5B Minus and Stage 5B services has used two scenarios, both including the latest performance figures of the GE and GWML¹⁰. The first scenario assumes that the Central Section is operating as forecast, and the second is based upon performance during the Timetable Demonstration period¹¹. The current performance of the Central Section will not support a reliable introduction of Stage 5B Minus, but it is steadily improving. RfLI should establish the required trajectory of reliability growth to support Stage 5B Minus opening in [REDACTED] 2022, and monitor performance against it.</p>	<p>Agree.</p> <p>At the time of writing, particularly since entering into Revenue Service, the railway has been performing well.</p>
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Crossrail Project Representative

Crossrail Joint Sponsor Team

Sponsor Summary

Project Status Report 163

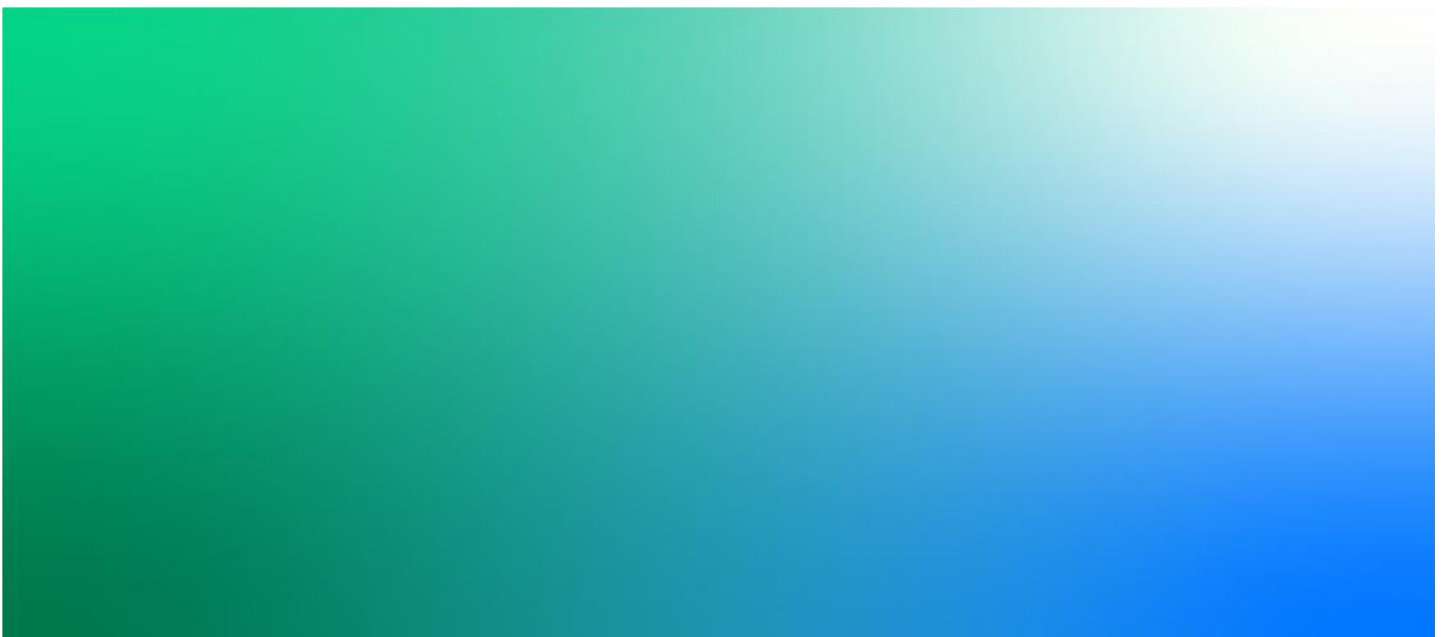
Period 1 | FY2022/23

2 April 2022 – 29 April 2022

Official – Sensitive Commercial

Document No: B2387600/163/1.9

27 May 2022



Sponsor Summary PSR 163

Project No: B2387600
 Document Title: Sponsor Summary for PSR 163
 Document No.: B2387600/163/1.9
 Date: 27 May 2022
 Client Name: Crossrail Joint Sponsor Team
 Client No: RM 3730
 Project Manager: [REDACTED]
 Author: PRep Team

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Limitation: This report has been prepared by Jacobs UK Ltd (Jacobs) pursuant to its contract (the Contract) entitled "TTW00033 Crossrail Project: Crossrail Joint Sponsor Project Representative" and dated 30 March 2020 with the Department for Transport (DfT) and Transport for London (TfL), DfT and TfL being the Clients. This report is prepared on behalf of, and for the exclusive use of the Clients and is subject to, and issued in accordance with, the provisions of the Contract. Jacobs neither has nor accepts any liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

Note: This report relies on the information set out in CRL's Period 1 reports augmented by more current information received by PRep during the course of our routine discussions with CRL since the Period close on 29 April 2022. Note that information emerging after the close of Period 1 is subject to formal confirmation by CRL in its Period 1 reports. This report is supplemented by our weekly reports to JST and regular meetings with JST staff.

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
1.	23 May 2022	PSR 163 Period 1 FY 2022-23 Sponsor Summary v1.8 ~ Draft	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
2.	27 May 2022	PSR 163 Period 1 FY 2022-23 Sponsor Summary v1.9 ~ Final	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Sponsor Summary

1. Headlines

1.1 Progress and Look Ahead

CRL and RfLI have committed to open Stage 3a of the Elizabeth Line on 24 May 2022¹.

Period 1 was characterised by minimal site completion activity and the prioritisation of Timetable Demonstrations in order to grow operational familiarity and overall railway reliability. The impact of this approach has been an improvement in the service performance measures, which is expected to have positively influenced the passenger service commitment decision.

With CRL working to complete the last few EOWs, the main focus in the period has been the closure of the remaining SJ Dependency for London Fire Brigade (LFB) communications. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] The LFB has issued a Letter of No Objection (LONO) allowing the Dependency to be closed, and this is being reflected in the final top level safety assurance documentation being prepared for ITAP submission. Additional ITAP meetings have been scheduled to accommodate the workload associated with final review and formal safety acceptance².

The installation of ELR200 signalling software in the Easter 2022 Blockade delivered the anticipated improvements in system reliability, and allowed the removal of a large number of Operational Restrictions. While a few regression issues have since been identified and largely rectified by CRL, a small number are still to be addressed shortly after passenger service opening. Issues with signalling Auto-Transition functionality at the GEML interface have continued to be investigated with additional testing undertaken, but the measures have not been completely successful and the trackside balises have been reverted to support manual transition. While this is not an issue for Stage 3 opening, an acceptable mitigation or permanent fix must be implemented prior to Stage 5B opening.

RfLI has continued with Timetable Demonstrations to embed learning, improve reliability and reduce fix times for delays. While some days have been lost to priority LFB rectification works, reliability improvement is evident. However, a range of issues continue to be monitored, such as GSM-R, PSDs, train specific issues and Under-Platform Extractors (which affect PSD operation); solutions to these are being implemented where possible. The introduction of passengers to the railway is likely to reduce overall reliability performance after Stage 3 opening because of interaction with railway systems. A resilience response plan will be implemented by RfLI in the early weeks of service to deal with potential eventualities and to ensure that any impact upon reliability is minimised. A 20 TPH trial was completed in early May 2022, which demonstrated Stage 5B Minus service operation.

With railway opening now scheduled for 24 May 2022, the remainder of the CRL organisation will merge into RfLI at the end of May 2022, with RfLI becoming fully responsible for the delivery of remaining works and operation of the railway. Some senior management staff from CRL will remain with RfLI, together with a sizeable number from CRL's technical team. This approach will support knowledge transfer and provide resilience to the delivery of outstanding works. The prolongation risk associated with the completion of the final opening stages may result in additional Indirect resource costs.

¹ All dates and observations shown in this document are correct as at Draft report issue on 23 May 2022; this Final report notes that the start of passenger service was successfully achieved on 24 May 2022.

² ITAP acceptance of the safety case for entry into passenger service was achieved on 16 May 2022.

The opening of Stage 3 passenger service will mark a significant milestone in the delivery of the Elizabeth Line; however, important scope items remain beyond Stage 3 opening. Fire stopping and fire suppression works are outstanding at Bond Street Station, with opening targeting ██████████ 2022. CRL and RfLI continue to work to an earliest start to Stage 5B Minus services. DCS v1.3 development for the end-to-end railway (including Stages 5B and 5C) continues, with a number of workstreams nearing completion. These include: GEML interface signalling transition; Auto-Reverse functionality; signalling software (ELR210); train software (H5.73); reliability growth; PSDs, Bond Street Station; timetable readiness; communications and control systems upgrade; maintenance backlog reduction; access requirements; and Plumstead alternate power³.

1.2 Health and Safety

No incidents or accidents were reported from CRL’s construction related activities in Period 1. RfLI reported one operational incident, which is under investigation. Work sites are being progressively reduced in size and number and CRL’s reported safety statistics remain representative of site activities and are within the parameters set by the Programme.

2. Programme Overview

2.1 Schedule

CRL is still developing its detailed schedules for Stages 5B Minus, 5B and 5C, and schedule risk remains unconfirmed pending completion of the DCS v1.3 update. However, CRL has refined its assessment from last period, enabling it to carry out a QSRA for these remaining opening stages. The resulting Period 1 completion milestones are set out in Figure 2 - 1.

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Figure 2 – 1: Summary of Programme Completion Cardinal Milestones⁴

³ Elizabeth Line Performance Review held on 12 May 2022.

⁴ Period 1 EPPR meeting pack issued 17 May 2022.

Risks remain with many unresolved scope items which are being evaluated in the development of DCS v1.3; these scope items are set out in Section 1.1. Completion of DCS v1.3 development is expected by the end of Period 2 for Stage 5B Minus, and by the end of Period 3 for Stages 5B and 5C.

2.2 Commercial and Risk

At Period 1, CRL is reporting⁵ no change from its Period 13 forecast; the P50 AFDCD remains at £15,963m and the corresponding [REDACTED]. The Period 1 draft P50 AFDCD is £ [REDACTED] above the current £825m funding threshold and £ [REDACTED] under the £1.1bn funding limit. Spend in the period was £ [REDACTED] (£ [REDACTED] lower than forecast) and is expected to reduce to £ [REDACTED] for next period; COWD to Period 1 is £ [REDACTED]

The AFDCD continues to remain stable, with CRL demonstrating containment of costs and identifying tangible cost reductions. CRL drawdown on its contingency was nominal, at approximately £ [REDACTED]. However, the net impact of increases without identified offset and reductions has resulted in an increase of £ [REDACTED] transferred to the CRL Programme Reserve.

We expect the confidence in, and increased certainty of, Stage 3a opening on 24 May 2022, to reduce related risks and underpin the known and identified residual risks reported elsewhere in this report. Consequently, CRL and RfLI will focus on the delivery of Stages 5B Minus, 5B and 5C, which will effectively become a £ [REDACTED] project with £ [REDACTED] CTG and £ [REDACTED] contingency.

CRL has carried out an update to the QSRA in the period as part of DCS v1.3 development, drawing on the existing QSRA and using inputs from the Operations, Signalling and Residual Works Teams. A Risk Workshop for Stage 5B Minus was held on [REDACTED] April 2022 and for Stage 5B on [REDACTED] May 2022. CRL will be reviewing and updating the risks identified from the QSRA during May 2022 as part of the DCS v1.3 update. Level 1 Programme Risks are currently unchanged from those reported to ELDG in Period 13, with reviews planned during May 2022. We expect that Level 1 Programme Risks will be replaced with Elizabeth Line Operations Risks after the start of Stage 3 passenger service.

As a result of changes made to the management of risk and contingency, CRL has not undertaken a Programme QCRA this period. The key areas of cost exposure reported by Projects in the PDRs over and above budget submissions made at Period 11 imply that there is a potential approximately £ [REDACTED] additional exposure which may need to be covered by Programme contingency. The QSRA is presently unchanged from Period 12, implying a potential approximately £ [REDACTED] additional exposure arising from prolongation of Stages 5B Minus, 5B and 5C.

These emerging risk costs might be drawn from the current £ [REDACTED] contingency provision adding further pressure to CRL's ability to outturn to the £825m funding limit. It is therefore likely that CRL will outturn close to its P50 AFDCD which continues to be below the £ [REDACTED] funding request limit.

⁵ Period 1 EPPR meeting pack issued 17 May 2022.

2.3 Organisation

With CRL and RfLI now committed to passenger service opening on 24 May 2022, there is expected to be some further demobilisation of CRL staff at the end of May 2022; however, the majority of the departures will take place in ██████████ 2022⁶. This is in line with demobilisation plans for the Programme, and the completion of responsibility transfer to RfLI for the railway and for the opening of the follow-on stages. Some of CRL's key resources will remain for the foreseeable future, together with a sizeable technical team to support RfLI in securing Stage 5 opening.

The only station site that has substantial resources engaged is Bond Street Station; this is expected to continue until at least ██████████ 2022.

2.4 Stage 3 Timetable Demonstration and Passenger Service

The Timetable Demonstration period has generally proceeded as planned, with intrusive works and exercises kept to a minimum, and only taking place when critical to Stage 3 delivery. This has created a more stable railway operating environment than in Trial Operations, with sustained improved reliability performance, and the occasional achievement of PPM levels in excess of ██████████. During Trial Operations, the average PPM was ██████████ which has risen to approximately ██████████⁷ during the Timetable Demonstrations, with an improving trend. The metric 'delays greater than 15 minutes' is also improving, with an average of ██████████ per day during the Timetable Demonstrations; the target is 0.5. However, the thresholds set for passenger service have not yet been met, and it is reasonable to expect performance to initially fall in the early stages because of passenger interaction with the railway systems, particularly the PSDs.

RfLI intends to mitigate the initial impact of passengers upon performance by implementing a number of resilience measures. These include preventing passenger access until approximately an hour after trains have entered service in the mornings, allowing the operator time to manage any service start-up issues; having additional operational and technical staff located at strategic points around the network; and allocating poor performing trains to non-Stage 3 services. RfLI and MTRREL are likely to adapt their processes and procedures as it learns how the railway behaves in service.

The commitment to passenger service was made at a Go/No Go review on ██████████ May 2022, when it was determined that ongoing performance improvement would allow a sufficiently reliable passenger service to operate from 24 May 2022. The decision would have acknowledged the further reliability improvements anticipated from the deployment of train software H5.7, from early May 2022 onwards.

2.5 Stations Commissioning and Handover

While CRL has declared that Canary Wharf Station is now ready for passenger service, completion of asset data delivery is outstanding. The processing and upload of asset data to RfLI systems for review is not expected to be completed until after Stage 3 opening, so contractor support as the MoBo is necessary. This requirement is forecast up to the end of ██████████ 2022, with full handover completion to RfLI shortly thereafter; ECHC documentation will be completed in ██████████ 2022.

Back-of-house safety screens were completed at Whitechapel Station, ahead of passenger service opening. Replacement of escalator skirt lighting on all stations is likely to require an extended programme of works with additional costs, but this does not prevent entry into passenger service.

⁶ Executive Programme Performance Review held on 18 May 2022.

⁷ ██████████ March 2022 – ██████████ May 2022, consisting of ██████████ operational days.

[REDACTED]

[REDACTED]

The decision to proceed with Stage 5B on [REDACTED] 2022 will need to be made by late [REDACTED] 2022, when NR must be advised what service pattern will be introduced in the new [REDACTED] 2022 timetable. The availability of Auto-Reverse functionality at Westbourne Park and the delivery of system reliability remain two main areas of concern.

Implementation of Auto-Reverse will require the prior delivery of infrastructure works, train software and signalling CBTC software changes. The schedule for delivery of infrastructure works, as currently scoped, is understood to have improved from [REDACTED] 2023, reported last period, to [REDACTED] 2023. The [REDACTED] date is [REDACTED] after the scheduled start to Stage 5B services. CRL intended to work with the ORR to establish if temporary measures (e.g. motion detectors) could be applied in the short term. However CRL and RfLI are now doubting that the temporary mitigations could be installed and approved any quicker than the permanent measures.

Assessment of whether service reliability is adequate for Stage 5B may be more straightforward than for Stage 5B Minus, as there is expected to be approximately [REDACTED] of Stage 3 passenger operations data available, together with the outputs from three or four 24 TPH service demonstrations. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Current modelling of Stage 5B Minus and Stage 5B services has used two scenarios, both including the latest performance figures of the GE and GWML¹⁰. The first scenario assumes that the Central Section is operating as forecast, and the second is based upon performance during the Timetable Demonstration period¹¹. The current performance of the Central Section will not support a reliable introduction of Stage 5B Minus, but it is steadily improving. RfLI should establish the required trajectory of reliability growth to support Stage 5B Minus opening in [REDACTED] 2022, and monitor performance against it.

Stage 5C is scheduled to start on [REDACTED] May 2023. The timetable bidding process requires RfLI to commit to the opening date by [REDACTED] 2022¹², although RfLI and NR are exploring if it can be adjusted, if it means that better evidence will become available (e.g. software delivery dates). [REDACTED]

[REDACTED]

RfLI is likely to focus upon the implementation of Stage 5B Minus in [REDACTED] 2022 and Stage 5C in May 2023, and accept some level of flexibility with regard to Stage 5B opening. Stage 5B Minus requires a solution to the Auto-Transition issue to be identified before the decision point. Acceptance of a May 2023 Stage 5C start by NR is likely to require a mitigated service to be identified (which could be a variant of the Stage 5B service). This might give assurance to NR, should there be an initial lack of confidence in Stage 5C.

¹⁰ Performance figures from 2021/22 Period 10 – Period 13.

¹¹ Forecast [REDACTED] modelled performance [REDACTED] based on Timetable Demonstrations.

¹² Timetable bid process milestone known as [REDACTED].