



Crossrail Project Representative

Crossrail Joint Sponsor Team

Sponsor Summary

Project Status Report 148

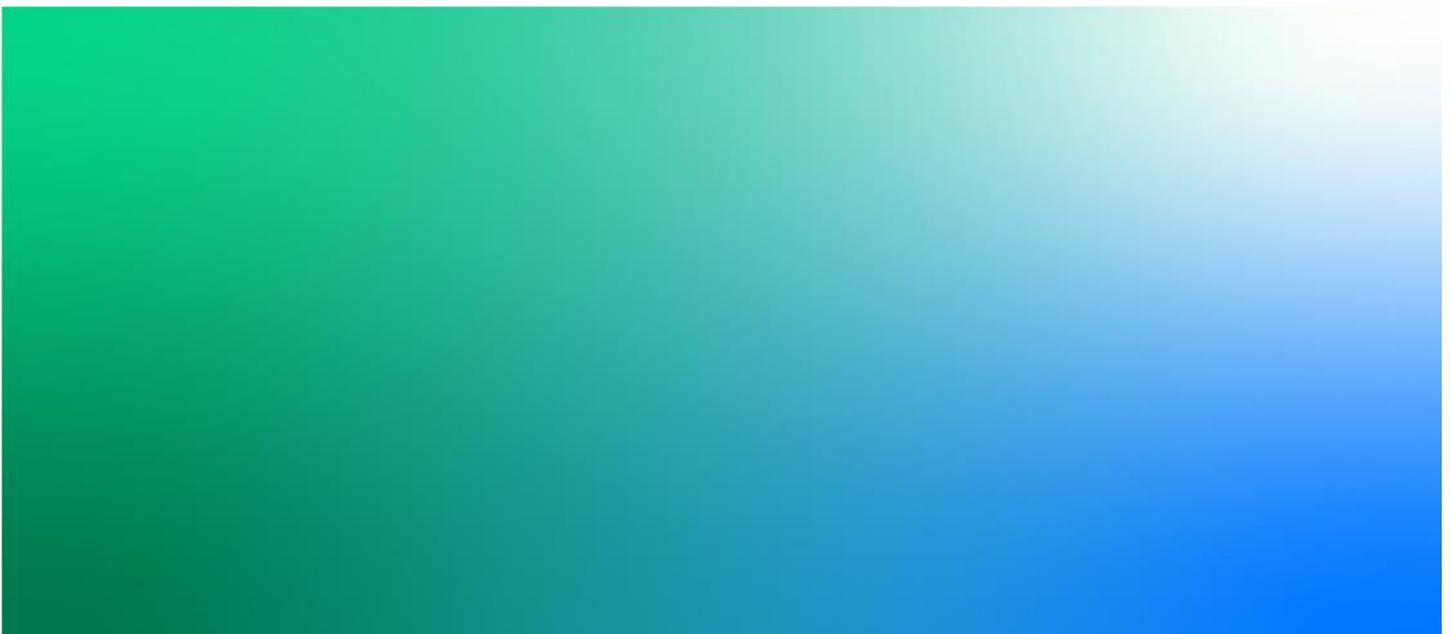
Period 12 | FY2020/21

7 February 2021 – 6 March 2021

Official – Sensitive Commercial

Document No: B2387600/148/1.8

1 April 2021



Sponsor Summary PSR 148

Project No: B2387600
 Document Title: Sponsor Summary for PSR 148
 Document No.: B2387600/148/1.8
 Date: 1 April 2021
 Client Name: Crossrail Joint Sponsor Team
 Client No: RM 3730
 Project Manager: ██████████
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Note: This report relies on the information set out in CRL's Period 12 reports augmented by more current information received by PRep during the course of our routine discussions with CRL since the Period close on 6 March 2021. Note that information emerging after the close of Period 12 is subject to formal confirmation by CRL in its Period 12 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.	29/3/2021	PSR 148 Period 12 FY 2020-21 Sponsor Summary v1.6 – Draft	██████			
2.	1/4/2021	PSR 148 Period 12 FY 2020-21 Sponsor Summary v1.8 – Final	██████			

Sponsor Summary

1. Key Observations in the Period

Routeway integration tests have been completed and software configuration TR2 Point Release 6+ has been commissioned successfully; no further functional testing is necessary to start Trial Running. The two stations required for Trial Running achieved their BIU and SC3 ROGS milestones: Farringdon Station on 5 March 2021 and Custom House Station on 15 March 2021. Paddington Station started its T-minus countdown to SC3 ROGS, and Liverpool Street, Tottenham Court Road and Woolwich Stations are also in progress.

CRL met its [REDACTED] of 26 March 2021 for transition into ROGS¹, with RfLI now taking responsibility for System Operator and Infrastructure Manager under the new ROGS Rule Book. A [REDACTED] of Trial Running is due to start on [REDACTED], immediately after commissioning of the Great Western Fringe. The operation of an initial timetable service of 4 TPH is scheduled for [REDACTED], immediately following commissioning of the Great Eastern Fringe.

The T-minus process is maintaining its intense momentum and focus to meet the transition to the ROGS date and the start of the Trial Running period. The T-3 and T-2 reviews indicate that the main area of focus remains within Assurance, but also highlighted a late change in strategy requiring an Interim Maintenance plan for implementation in the first weeks after transition to ROGS. This will allow safety critical maintenance to be undertaken in the first [REDACTED] period prior to a controlled introduction of a timetable service. An important safety procedure for working safely on the high voltage electrical interfaces at stations and Routeway in the ROGS environment also requires clarity, agreement and briefing to all parties. Late receipt by CRL of RfLI's latest procedures may impact CRL's supply chain compliance with the new requirements. Clarity on safety procedures will be a major condition before scheduled works can take place in the ROGS environment.

CRL's supply chain will support RfLI in undertaking interim maintenance in the initial [REDACTED] period post ROGS. This is required as a result of CRL's incomplete supply of Asset Data and maintenance records and previous block maintenance scheduling, that will become out of compliance immediately after entering ROGS. Training of sufficient contractor resources in safety supervisory roles to support the maintenance work is also an important concern. CRL might be constrained with the numbers it can both mobilise externally and train internally, to undertake the maintenance works in the initial period under ROGS.

The safety assurance process has continued to be intricate, with multiple documents running concurrently, with dates and meetings rescheduled to accommodate the slow closure of Dependencies and StEJ process. The hierarchical critical documents that require acceptance by RAB(C) ahead of transition into ROGS include the COS SJ based on clearance of Dependencies, the CESAC at RAB(C), and the RfLI's safety documents and in particular RfLI's Rail System Non-Traction Power (RSNTP) and DoCoR. The agreement of RfLI's Interim Maintenance Plan also relies on the outcome of the assurance process.

DCS v1.2 is currently under development². It will represent a significant refresh to CRL's control schedule, providing greater clarity and assurance through to Programme completion; to Trial Operations, Stage 3 Passenger Service and to Stage 4 and 5 opening. It is intended to confirm how the railway configuration is to be implemented, and to provide more certainty on the costs-to-go. Fundamental considerations in its development and assessing impact on the Trial Running period and Trial Operations date will be: capturing lessons learnt from the assurance process, implications

¹ CRL letter, Crossrail PRep Project Status Report 147 – Period 11, dated 17 March 2021.

² Project Performance Reviews held on 11 and 12 March 2021.

of change in strategy in entering Trial Running, time apportioned between RfLI planned maintenance, System Train Testing (STT), and completion of final infrastructure works. With the focus heavily on achieving Trial Running, it might not be possible currently to give the necessary team attention to deliver the earliest robust DCS v1.2, which is anticipated for the [REDACTED].

The period to Trial Operations will be challenging, with a substantial volume of activities to complete in the Trial Running period that will include: concurrent station delivery, and the deployment of a major software release (ELR100) as another crucial activity. Demand on resources in the peak summer months is expected as a result of a release from National lockdown and holiday season [REDACTED]. These provide collective challenges that have the potential to impact the start of Trial Operations.

We remain concerned that, despite a slight improvement in station productivity, emerging schedule pressures continue in delivery. A review³ identified challenges with the delivery of four stations (Bond Street, Whitechapel, Paddington and Canary Wharf) for which mitigation measures will need to be developed. These are likely to include, further enhanced collaboration from all parties, streamlining and modification of the assurance process to suit the “tail end” activities, and earlier transition to IM handover. Concessions may be required to achieve the challenging dates for delivering Bond Street Station in time [REDACTED] for Trial Operations and Stage 3 Opening, if it is not to put at risk the broader railway opening for Stage 3 Passenger Service. While significant cost pressures remain across the stations, engaging the General Works Contractor by [REDACTED] is anticipated to realise cost savings.

CRL continues efforts to control scope. While there is still work to complete, the implementation of the Programme Change Panel by end of March 2021 and the anticipated Star Chamber [REDACTED] will benefit the Programme to better control scope and therefore its costs. However, these positive initiatives will require a few more periods before the full benefits will be realised.

The impacts from the negotiated Supplemental Agreements for Liverpool Street, Farringdon, and Tottenham Court Road Stations, and prolongation in respect of C660, considered in preparation of the Period 12 AFDC, result in a [REDACTED] increase to the Period 11 AFDC of £15,885m. This increase has been subsequently reduced by the realisation of risk provisions and allowances to a [REDACTED] net increase to [REDACTED] for the Period 12 AFDC. However, the Period 12 EPPR⁴ proposed three options to further offset by Risk and CEO contingency adjustment to hold the AFDC at £15,885m. We remain concerned that, at this late stage, the project AFCs and Indirect Costs do not yet include for all the efforts necessary to deliver the Programme. This is due to the emergence of new cost pressures and the impacts of lower than predicted delivery performance against the DCS baseline. The AFDC does not seem to have given consideration to the volume of deferred works to be undertaken in the ROGS environment, and this is also a concern.

In conclusion, based on our Period 12 status report, we recommend that the following questions are considered by Sponsors and the CRL Leadership Team:

- 1) In the finalisation of DCSv1.2, how will CRL ensure schedule and costs are aligned between the Tier 1 contractors and the supply chain?
- 2) With competing demands for entry into Trial Operations, what criteria will RfLI/CRL apply to ensure the most critical activities are prioritised so as not to impact the Trial Operation date?

³ Elizabeth Line Delivery Group, extraordinary meeting, Stations Deep Dive, meeting on 9 March 2021

⁴ Executive Programme Performance Review, Period 12 ending 6 March 2021, meeting on 23 March 2021

2. Health and Safety

Four High Potential Near Misses occurred in Period 12 and, while the Safety Performance Indicator increased slightly, the overall indicators remain within those set by the Programme. SHEL101 marks the change to an operations and maintenance railway environment. CRL's continued vigilance against Covid-19 is seeing a steady decline in cases across sites.

3. In-Period Progress Overview

3.1 Recovery Plan and Schedule

CRL continues to use the DCS v1.1 Base Case [REDACTED] for measuring Programme performance. A refresh to the control schedule is now required to reflect the period from Trial Running to Stage 3 Passenger Service to Stage 4 and 5. With conflicting demands on limited senior resources, the preparation and finalisation of DCS v1.2 to include CRL's update to the AFC by the end of [REDACTED] is likely to be a challenge.

The critical path to Trial Running is being managed through the T-minus meetings. The T-4 and T-3 meetings have highlighted that completion of safety assurance activities is being compressed to become concurrent, as the [REDACTED] transition into ROGS and entry into Trial Running are maintained. RAB(C) Acceptance of CRL's COS SJ and associated Dependency closure achieved on 18 March 2021 is the precursor to the concluding CESAC document. RfLI's assurance process continues to be heavily reliant on supporting information from CRL. The status of CRL's maintenance records and Asset Data is a vital input to RfLI's Maintenance Plan. The late receipt of these records, and other supporting information from the assurance process, is resulting in pressure on RfLI to complete its own assurance documents. While completion of the Declaration of Control Risk (DoCoR) represents a consequential risk at a late stage in the assurance process.

DCS v1.1 indicates the critical path to Trial Operations remains [REDACTED], although Woolwich Station is close to the critical path, as is assurance of signalling software configuration ELR100. A final update to the COS SJ, CESAC and DoCoR, to take account of the completion of SC3 ROGS at the stations is also close to the critical path.

3.2 Handover Delivery and Assurance

SC3 ROGS and handover to RfLI was achieved for Farringdon Station on 5 March 2021, and for Custom House Station on 15 March 2021. This completes the two required stations to be at SC3 ROGS for the start of Trial Running. There are lessons to be learnt from the Farringdon Station process that are anticipated to be shared across the remaining stations, particularly related to concessions and follow through on commitments.

Only Canary Wharf and Bond Street Stations have yet to achieve their SC3 Milestones, which are forecast for [REDACTED] and [REDACTED], respectively. All other stations have now achieved SC3 and have either entered, or are preparing to enter, the T-12 countdown to SC3 ROGS and BIU.

With the station shafts at Woolwich West, Bond Street West and Liverpool Street Stations removed from the declared configuration state for Trial Running, [REDACTED]. Liverpool Street and Bond Street Stations are progressing compliant documentation for the end of March and early April 2021, respectively. Woolwich West Station Shaft may require a pragmatic approach, if additional cost and schedule time is not to be incurred, which is currently not included in CRL's cost forecasts.

Handover of Plumstead Maintenance Facility was achieved on 19 March 2021, with exception works to follow-up.

3.3 Stage 3 Trial Running and Trial Operations

Preparations for transition into ROGS and entry into Trial Running highlighted⁵ the criticality of Asset Data, completed maintenance records and planned maintenance to support RfLI's Maintenance Plan under ROGS. Finalisation of the interface Management Strategy for Station HV/LV electrical supplies is another high risk area that requires clarity and agreement before starting works under ROGS. Completion of all RfLI's related safety assessment items is also critical to demonstrate readiness to enter ROGS.

Initial preparations for Trial Operations remain on schedule, with the Passenger Service Steering Group (PSSG) scheduled to be effective immediately after transition into ROGS.

SIDT ended in mid-March 2021 as planned, with the timetabled operation of up to 8 trains completing 94% of planned mileage and achieving 88% PPM. Overall, the implementation of SIDT (effectively a period of Trial Running activities undertaken during Dynamic Testing) developed the confidence and skills of RCC staff and was considered beneficial to Programme delivery, and should contribute positively to Trial Running.

3.4 Stage 2B Operations

FLUs operating on the GWML are being loaded with the software configuration that provides sufficient reliability to operate to both Heathrow and Reading. RfLI can now operate a 4 TPH service to Heathrow, but is choosing not to do so while airport passenger demand is impacted by Covid-19.

3.5 Future Stages

Stage 4A timetable will be implemented in [REDACTED], although the original objective of starting service solely with FLUs will not be met. There is a reasonable risk that FLUs will not be available at the start of timetable change, due to necessary software configuration availability. The initial limited 4 FLU service is expected to rapidly increase to a full fleet after the August 2021 Blockade.

RfLI continues to develop its proposals for the implementation of [REDACTED] services and intends to complete the implementation in [REDACTED] (aligned with the [REDACTED] and [REDACTED]). [REDACTED] appears to be RfLI's selected course of action to replace [REDACTED] and, [REDACTED] this could be implemented, assuming the relevant reliability criteria have been met. As this constitutes a change to the PDA, this is likely to go through the change process.

3.6 Organisation Transition

The CRL team is engaged with TfL to transition the resource management and associated Workforce Plan to TfL's responsibility, while CRL maintains responsibility for recruitment of Programme critical specialist resources. [REDACTED]

[REDACTED] Until this is resolved, this may pose a threat to delivery.

4. Ongoing Concerns

4.1 Stage 3 – Trial Running and Trial Operations

The T-3 review indicated the same significant challenges as T-4, with greater intensity to resolve before transition into ROGS on 27 March 2021 and commencing the period of Trial Running on [REDACTED]. The assurance process continues to show signs of strain, with many interactive documents that require substantial work to complete for entry into Trial Running. This is related

⁵ T-4 and T-3 Trial Running Readiness Reviews 2 and 9 March 2021, respectively.

primarily to rate of Dependency closure and StEJ process, speed of evidence flow through the respective parties, as well as addressing RfLI's outstanding critical issues to support important documents such as the COS SJ and CESAC. Resulting concurrency is adding to the challenges faced by both CRL, RfLI and simultaneous acceptance at RAB(C). This includes Rail Systems & Non-Traction Power (RSNTP) certification, RAB(C)'s acceptance of the CESAC and RfLI's DoCoR in the final days leading up to the [REDACTED] transition to ROGS.

Resolution of the Maintenance Plan and an agreed Intervention Strategy for HV/LV electrical issues are important considerations by both CRL and RfLI for work in ROGS and Trial Running. An intense schedule of reviews by CRL and RfLI highlights incomplete Asset Data, which includes Signalling, as well as Care and Custody maintenance records. The 'block' nature of asset compliance means that large numbers of assets have a similar expiry date that RfLI requires smoothing out for its resources to manage a steady flow of compliance work. Consequently, a period of intensive maintenance works is required immediately after entering ROGS to address the situation, and RfLI propose⁶ a controlled introduction to start of Trial Running. This work is expected to last until at least [REDACTED] before train services start to operate. The approach also allows the mobilisation of sufficiently safety trained resources to work under ROGS. Consequently, CRL is now indicating a [REDACTED] for [REDACTED] for starting Trial Running.⁷

In the Trial Running period, there will be competing elements of work to complete before entering Trial Operations; these include, deferred and outstanding testing and infrastructure works (including Programme integration works for PSD/TVS, door opening issues and Plumstead power supply and related Improvement Programme for Engineering hours). A major software (ELR100) development is showing emerging signs of schedule pressure. With its deployment and assurance planned in the same period as the August 2021 Blockade, this is another crucial activity that could be very demanding to achieve with train testing ahead of Trial Operations. Achieving train reliability growth under timetable operations is likely to be a dominant theme for Trial Running and will be an important criteria for entering Trial Operations. Reliability Growth is a growing concern, with train mileage currently 37% less than planned entering into Trial Running⁸, and this will require due consideration over infrastructure works, if entry to Trial Operations is not to be impacted. Other Programme demands are also likely in the peak summer holiday months, [REDACTED] and a release from National lockdown.

The impact of the [REDACTED] maintenance period is a late added risk to the Trial Running period that is yet to be quantified. This, together with the identified volume of work to complete, schedule productivity challenges, further pressure on mileage accumulation and major software release, suggests the schedule is already under threat and therefore the [REDACTED] start of Trial Operations is at risk.

4.2 Stations Assurance and Commissioning for Trial Operations

A review⁹ of the issues and challenges facing the Stations delivery to achieve the [REDACTED] Stage 3 Passenger Service indicates pressures associated with scope, assurance schedule and cost in delivery of four of the stations (Bond Street, Whitechapel, Paddington and Canary Wharf). A centralised approach to assurance resources is resulting in a prolongation of assurance activities, and a backlog of deferred works as stations are forced into a queue system. Past performance up to Period 12 has been below plan and there is not much evidence to indicate forecast

⁶ RfLI proposition - The Route to Trial Running 'Controlled Introduction', presented to RAB(C) on 11 March 2021.

⁷ Integrated Programme Review Part B, 17 March 2021.

⁸ Presentation to Elizabeth Line Reliability Board held on 2 March 2021

⁹ Elizabeth Line Delivery Group, extraordinary meeting, Stations Deep Dive, 9 March 2021.

rates will substantially improve in coming periods, as forecast station milestone dates are maintained in the period. Mitigation measures under consideration to aid delivery include further enhanced collaboration from all parties, streamlining of the assurance process to the end of the Programme and handover process to the IMs. Engagement of the General Works Contractor [REDACTED] is expected to realise cost savings, although significant cost pressures remain.

For Bond Street Station to achieve the challenging date of [REDACTED] for SC3 ROGS, a change in approach will be required to deliver a functional station but safe to operate. This will require an [REDACTED] and an associated [REDACTED] increase in AFC. In the meantime, indications suggest that the completion of assurance for SC2 for [REDACTED] will be challenging. We believe that the proposed [REDACTED] will present CRL with a serious challenge and the task may be overly ambitious. The drive for SC3 should not distract from the primary objective of [REDACTED] as the absolute minimum [REDACTED].

While Paddington Station entered the T-12 countdown process to SC3 ROGS, it continues to be confronted by poor assurance productivity that is likely to impact its completion date, adding further pressure to start of Trial Operations. The consequential effects and concurrency impact on other stations during BIU and Plateau 2 team resources is expected to require management interventions.

The update to DCS v1.2 in [REDACTED] is expected to include alignment of all Stations' final delivery schedules with the Tier 1 contractors and the supply chain, and provide greater understanding of the risks influencing the schedule. Preliminary assessments of DCS v1.2 and QSRA schedule risk output suggest there are challenges to maintain the [REDACTED] and variances will need to be addressed to bring them within expectations for Trial Operations and Stage 3 Passenger Service. Initial indications suggest mitigations planned for Bond Street Station will need to be successful to avoid a [REDACTED] delay to Trial Operations.¹⁰

4.3 Commercial and Risk

During Period 12, CRL commenced its review and challenge on the Cost Pressures which, last period, were [REDACTED]. The impact of this initial review has reduced the figure to [REDACTED], but continues to be excluded from the reported AFCDC. The positive move to review and challenge is intended to continue through Period 13, in order that all cost elements are included within the reported AFCDC figures and the DCSv1.2 refresh. The Cost Pressures review may identify the wider duplication of Risk provision and could reduce the level of allowances, by removing the need for Scope Gap provisions at [REDACTED]. We expect that some currently budgeted outstanding scope may be deferred into the post-Trial Operations period, and could become included as part of an OpEx provision. This is a potential risk that we expect to be considered by CRL in finalisation of the DCSv1.2.

From the Period 12 AFCDC 'Base Case' of [REDACTED] presented at the Period 12 EPPR, the Risk and Provisions element is [REDACTED], a reduction of [REDACTED] from Period 11. This is the position without the application of the Period 12 EPPR offset options. With the proposed introduction of targeted mitigated risk position (as adopted by TfL), CRL is setting the direction for shifting focus towards reporting a post-mitigated view for future periods. This has the benefit of presenting a more favourable risk position for both cost and schedule, but is reliant on successful interventions to realise savings. We continue to consider the forecast to be understated.

¹⁰ Period 11 Integrated Projects Review held on 17 March 2021.

We remain concerned that we have not been sighted on, or received briefing of, the Supplemental Agreements that form part of a Commercial Strategy being considered for the remaining elements of the Crossrail Programme, as the transfer of the assets to the IMs becomes closer.

Resourcing is reported to be 50 FTE below the Workforce Plan (WFP) approved in January 2021. While this should provide cost savings against forecast, only 10 roles are currently being recruited of the budgeted 56 vacancies. A WFP review is expected to align with the DCS v1.2 as this is finalised.

4.4 Organisation

Schedule pressures and slippages due to productivity challenges in the critical Trial Running period may require [REDACTED]

CRL continues to implement its Change Management process, although it is evident that further engagement and communication at a project level is necessary, as requested by its project commercial teams. The process is being enhanced to include a Programme Change Panel, although this is not expected to be in place until the end of March 2021; this will have the primary purpose of managing emerging scope and cost. A 'Star Chamber' is expected to be formed to manage existing long-standing scope and associated cost impacts, this is anticipated to be fully established for [REDACTED]. CRL's executive team is also implementing an initiative to review scope emergence from all parts of the Programme, including Programme-wide instructions. While these processes and initiatives would normally already be well established on a major Programme, we recognise these as positive steps; however, they will require time to fully arrest scope creep and finalise the Programme costs-to-go.