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██████████
Project Representative
Jacobs

9 July 2021

Dear ██████████,

Re: Crossrail PRep Project Status Report 151 – Period 2

I am writing in response to the Period 2 PRep Sponsor Summary cover letter; this response is structured for ease of cross-referencing to the PRep's summarised concerns.

Access Improvement Plan

Period 2 covered the period shortly after CRL's transfer to a ROGS environment and the commencement of timetabled train movements. The transition to an operational railway is one of the most complex and challenging events in the Programme's history. The bedding in of people and processes in a new and safety critical context was always going to be challenging and the Project Representative is correct to draw attention to these challenges. However, the transition was completed safely and within our P50 risk provision. In order to reduce the challenges that CRL has encountered under the requisite ways of working, the Access Improvement Implementation Project (AIIP) initiative has been set up to secure safety critical resources and support existing access procedures. Further improvements are expected to alleviate existing challenges including addressing the resource deficit required for key positions, production of a consolidated safety critical resource plan that clarifies CRL and RFLI training requirements, and production of a Lock Down Access Plan for the remaining Trial Running period.

The AIIP initiative has always planned to be delivered in three phases to: 1) protect as much access as possible leading up to the Blockade; 2) plan and execute the Blockade so as to reduce the need for trace affecting access in the Stations; and 3) lock down the Access Plan post-Blockade. The Access Control Unit (which is tasked to reinforce single integrated access requirements between CRL and RFLI across delivery, maintenance and operations) will be implemented upon completion of the Blockade as agreed.

Maintenance Delivery

As part of the outstanding Maintenance Bridge workstream, CRL has defined the work to be completed in the Trial Running Plan including Tier 1 work within the ongoing Blockade. An agreement has been reached between CRL and RFLI on how the work will be divided, and resources allocated. RFLI is currently in the process of defining the Maintenance Strategy,

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however, delivery of these works is not expected to impact on the revised Trial Operations target date of [REDACTED].

The challenges that CRL has encountered since the transition to a ROGS environment has impacted on productivity levels, particularly across the Stations. In order to mitigate low productivity rates, an Engineering Hours Improvement Programme (EHIP) is in place to maximise available engineering hours in each Engineering access window and establish a stable maintenance plan which will include the refinement of metrics to provide clarity on what is expected to change and the timings of these changes. Any benefits will be fed into the maintenance plan, with some EHIP benefits being delivered early such as Auto Switching in the Blockade. Currently, a conservative estimate is showing that an extra hour of productivity is being accrued as a result of the EHIP intervention.

Development of the Programme Baseline 1.2 / DCS 1.2; Signalling Software and Stages 3/4/5

Throughout and despite the challenges, I am proud of what our supply chain, Crossrail, RfLI, London Underground and MTR colleagues have achieved. Woolwich and Liverpool Street stations achieved handover on 25 June 2021 (in line with our target) and 5 July 2021 (4 days after our target) respectively, bringing the number of stations handed over in readiness for Trial Operations to five.

At the time of writing, Trial Running is suspended as planned to accommodate the Blockade work which commenced as planned on 21 June 2021 for a period of 18 days. The suspension is to ensure the Blockade is free of operations and maintenance activities in order to maximise the opportunity to complete uninterrupted works and emulate the success of last Summer's Blockade which achieved 97% productivity. Despite a slow start, we are reporting 93% total productivity to date and 80% total complete as at 4 July 2021. Daily reporting at an Executive and Programme level is being utilised, and the TfL Commissioner is updated daily on Blockade performance.

As I have written previously, the Programme Baseline 1.2 exercise is delivering a progressive update of the Delivery Control Schedule (DCS). This means that CRL makes key amendments to its schedule as the exercise continues rather than have a single product delivery date on which the refreshed DCS becomes available. There will however be a date at which the majority of the work within this progressive update has been completed, and [REDACTED] is being targeted for a draft of the Programme Baseline 1.2 outcomes. This will include updates for the Stage 4/5 programmes, Bond Street station Bringing-into-Use, and executing residual works.

An example of this progressive approach in action has been the incorporation of the J6 Staging Access Plan. The J6 plan has rephased the works to Trial Operations in light of the experienced challenges with delayed 4TPH ramp-up, access, and ELR100 signalling software. The Trial Running ramp up to 12TPH is scheduled for [REDACTED] which reflects the six-week delay in commencing 4TPH movements; ELR100 signalling software commissioning has a revised target date for [REDACTED]; and the subsequent commencement of Trial Operations is re-scheduled for [REDACTED]. These will be change controlled into the DCS and are being used for reporting purposes currently following Elizabeth Line Delivery Group agreement.



CRL acknowledges the Project Representative's concern regarding cost pressures across the Programme and the impact this may have on the funding limit. Delivering on or close to our deterministic programme remains the single biggest financial opportunity. Working towards this and making decisions whilst simultaneously considering financial implications will continue to drive CRL towards the best possible outcome. In addition to the Programme Baseline 1.2 update, work to identify the lowest cost to go is being undertaken. [REDACTED]

Critical Scope Items

In parallel with the Programme Baseline 1.2 development, the Scope Book exercise has identified the scope required for entry into Revenue Service [REDACTED]. The only areas that require final clarification against the Programme Baseline 1.2 target dates are [REDACTED]. Any changes in scope, identification of new scope and cost variations as a result of scope impacts will be subject to CRL's change control process under the management of the Programme Change Panel which meets weekly to evaluate Programme changes.

I hope this response provides a useful summary of the measures in place to address the specific issues you have highlighted. A more comprehensive response focussed on the content of the Sponsor Summary report will be issued as an Appendix to this letter.

Kind regards,

[REDACTED]

Mark Wild
CEO, Crossrail

Appendix – CRL Response to Period 2 PRep Report

Programme Response Category	PRep Period 2 Sponsor Summary Content	CRL Period 2 Response
<p>Observations in the Period</p>	<p>Timetable trial running started with a 4 TPH service on 10 May 2021. While the priority since then has been staff familiarisation of systems and processes ahead of train performance, 96% of planned mileage has been successfully achieved.¹ The increase from 4 TPH to 8 TPH on 7 June 2021 has allowed railway operations to be intensified and mileage accumulation to be stepped-up. Where feasible, RfLI is intending to carry out operational and system exercises during the Trial Running period, that would normally be undertaken during Trial Operations. Secondment of an MTREL Director with NR infrastructure management experience into RfLI to lead its infrastructure readiness initiatives is also another positive move. Woolwich Station SC3 ROGS/BIU is planned for 25 June 2021, and Liverpool Street Station is scheduled to closely follow in early July 2021, leaving four stations to complete.</p>	<p>In line with the Project Representative’s comments, timetabled 4TPH Trial Running commenced on 10 May 2021 with the initial primary focus on systems familiarisation and embedding of processes. The challenges encountered during the 4TPH scheduled Trial Running service did not impact on the planned commencement of 8TPH Trial Running on 7 June 2021.</p> <p>Woolwich station achieved handover status on 25 June 2021 as did Liverpool Street station on 5 July 2021. This milestone achievement brings the total Stations handed over to five, with four Stations remaining to achieve handover status. This accomplishment is a crucial step towards Trial Operations readiness.</p>
<p>Headline Concerns</p>	<p>Period 2 has been a period of uncertainty, with CRL and RfLI working on an Access Improvement Plan, the ELR100 delivery schedule, and their impacts upon DCS v1.2 development. Difficulties with safe controlled access to Routeway and Stations continue, and the development and implementation of processes which are fit for all of the Programme works to be completed (i.e. outstanding scope, maintenance, testing and reliability growth) remains the biggest priority. While the access issue remains unresolved, productivity continues</p>	<p>The Project Representative is accurate to point out the challenges encountered in the Period and CRL notes the Project Representative’s concern around the level of uncertainty that has emerged. However, the newly implemented Access Improvement Implementation Project (AIIP) initiative set out to support existing access procedures and manage access requirements between RfLI and CRL has achieved encouraging success in relation to access improvement. Further improvement outcomes are expected to alleviate challenges with actions in place to</p>

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	<p>to be significantly affected, and there is potential for further impact upon many future activities. A substantial change in approach is necessary to improve upon the approximately 60% of lost access opportunity that has occurred in the period. The full benefits of the proposed dedicated Access Control Unit (ACU) will only be realised when the team is fully established. With no date yet identified for the implementation of the Access Improvement Plan, it is likely that productivity will be severely reduced until [REDACTED]</p> <p>RfLI's Maintenance Bridging works continue to be affected by the ongoing access difficulties. Output is restricted because of limited working hours, and there is concern that what little maintenance is being achieved is behind the forecast. An appropriate management dashboard would allow this important metric to be tracked. Maintenance delivery might be further impacted with [REDACTED] maintenance support to RfLI due to finish [REDACTED].</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	<p>address the resource deficit required for key positions, production of a consolidated safety critical resource plan that clarifies CRL and RFLI training and competence requirements, as well as producing a Lock Down Access Plan for the remaining Trial Running period.</p> <p>The Access Control Unit tasked to reinforce single integrated access requirements between CRL and RFLI across delivery, maintenance and operations, will be implemented upon completion of the Blockade and after the endorsement of a transition plan.</p> <p>The Project Representative is accurate to point out the unpredicted challenges encountered in completing the Maintenance Bridging Works.</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]. Significant maintenance dependencies are being closed out in the Blockade such as the replacement of the Pressure Relief Valves on the fire main.</p> <p>Discussions are ongoing between CRL and RFLI to agree the support required to move RFLI's maintenance plan to a steady state so as to reflect Business As Usual by the commencement of Trial Operations.</p> <p>In order to mitigate low productivity rates, an Engineering Hours Improvement Programme</p>
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	<p>Station productivity has been severely constrained by the significant loss in access opportunity. This has impacted the schedules for Bond Street, Canary Wharf and Paddington Stations. CRL is implementing an alternative strategy for Asset Data for acceptance by RfLI, to maintain delivery to deterministic dates. This is expected to result in additional costs. Bond Street and Canary Wharf Stations are likely to target completion for SC2 and SC3 ROGS, respectively, in mid-September 2021; however, there are risks that further delays will emerge. The Bond Street Station delivery schedule for SC3 ROGS achievement in [REDACTED] is not yet supported by the supply chain, and performance metrics are needed to allow management of completion.</p> <p>Despite improved clarity of scope for Stage 3 (and to some extent Stage 4/5), CRL and RfLI seem unable to reach swift decisions on</p>	<p>(EHIP) is in place to establish a stable maintenance plan which will include the refinement of metrics to provide clarity on what is expected to change and the timings of these changes. Any benefits will be fed into the maintenance plan, currently a conservative estimate is showing that an extra hour of productivity is being accrued as a result of the EHIP intervention. Maintenance backlog burndown plan versus the actual work achieved is also being monitored and will be issued weekly based on the verified maintenance recovery plan per agreed delivery allocation.</p> <p>Although productivity rates across the Stations has been low in Period 2 principally due to access restrictions, Paddington station is on target to achieve its handover date of [REDACTED]. There will be some mitigation around asset data which has been agreed with RFLI and is in the process of being implemented. Canary Wharf and Bond Street stations are on target to retrieve lost time during the ongoing Blockade with the Assurance team actively engaged to support a mid- September handover at Canary Wharf station and SC2 milestone at Bond Street station. The delay in [REDACTED] may cause assurance verifications and Bringing Into Use at Bond Street station to potentially slip to [REDACTED], however, completion of physical works at Bond Street station will be achieved in [REDACTED].</p> <p>CRL has implemented a vehicle for aligning works to the General Works Contractor (GWC) and Residual Works Tracker (RWT) through the</p>
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	<p>criticality, timing of delivery, acceptability and operational impact, if completed beyond the IM's required date. [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]</p> <p>Deployment of software ELR100 will be delayed by up to 8 weeks. Consequently, the second blockade for completing TVS and ELR100 works is now likely to take place in [REDACTED]. Given that 4 TPH trials started close to the DCS v1.1 P50 date, and that the greatest risks to the schedule are resolution of access, delivery of maintenance compliance, and resources, the previously reported deterministic date for Stage 3 Opening is no longer viable. CRL is expected to finalise DCS v1.2 by [REDACTED], and</p>	<p>Programme Change Panel (PCP). The PCP has the opportunity for both Delivery Directors and Infrastructure Managers to agree allocation of scope to be delivered through Scope Allocation Surgeries (SAS). The flow of work from the pipeline of the scope book, through filtering meetings into the PCP for agreement to proceed, and finally for approval to deliver the work through the approved mechanisms after financial agreement has been obtained allows work to be prioritised and progressed in quick succession. Work classified as instructed or in the baseline is being progressed as agreed through [REDACTED] or into SAS for the attention of GWC or RWT. A programme wide delivery model is currently being developed which will align delivery functions and work reviews, so it is clear who is delivering what, and by when. Key to this is the imminent agreement of a number of [REDACTED] [REDACTED] [REDACTED]</p> <p>The Project Representative is correct in stating that deployment of ELR100 signalling software has been delayed. The delivery strategy has been updated to reflect this delay, and CRL is currently in the process of validating this top down view with detailed logic-linked schedule and associated Quantitative Schedule Risk Analysis (QSRA). Indications are that the Elizabeth line remains on track to be delivered within the first half of 2022 with several risks being closely managed.</p>
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<p>analysis to date suggests that it is still on track to start Elizabeth Line passenger services around [REDACTED], within the reported envelope of [REDACTED]. However, this remains to be validated by QSRA.</p> <p>Opening of Stage 4/5 is important because of potential new revenue streams, but it does not yet appear to be receiving sufficient attention. Ownership of plan development is unclear, and the opening strategy must be confirmed for operational impact assessment. The start of Stage 4/5 services is likely to be impacted by the delivery of a number of activities, the most prominent being signalling software ELR200 and reliability growth. [REDACTED] [REDACTED]. Confirmation of the signalling software development and delivery schedule is also urgently required. With the start of Stage 3 Passenger Service slipping against its deterministic date, the opening for [REDACTED] may move from [REDACTED] to [REDACTED].</p> <p>Our concerns are summarised below:</p> <ul style="list-style-type: none"> • Development of a robust, underpinned and risk assessed DCS v1.2 continues, without which key milestone dates and final costs remain uncertain; 	<p>The Programme Baseline1.2 update will include deterministic dates for [REDACTED] in accordance with the latest ELDG paper titled 'Update to the Elizabeth line Staged Opening Plan' which was presented on the 24 June 2021. The introduction of 24TPH scheduled service is dependent on a number of functionality items delivered as part of ELR200, ELR21x and ELR300. Siemens are in the process of confirming the delivery dates for these software updates and these will be used for the Programme Baseline1.2 deterministic schedule.</p> <p>In response to the Project Representatives summary concerns, CRL responds as follows:</p> <p>As stated in the corresponding Project Representative's cover letter, CRL is expected to produce a draft Programme Baseline1.2 update that will reflect the latest Blockade activities, revised milestone dates, updated assumptions, and confirmation of supply chain buy in. A subsequent Programme Baseline1.2 iteration is</p>
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	<ul style="list-style-type: none"> • The Access Improvement Plan, which is critical for baselining future productivity assumptions, has not yet been implemented; • There does not yet appear to be a strategic plan for maintenance delivery, and this is a significant threat to the start of Trial Operations; • Progression of critical scope items from agreement to readiness for implementation, including agreement on delivery mechanisms, is unacceptably slow; 	<p>anticipated in [REDACTED] when further clarity around Stage 4 and Stage 5 is expected. These will feed into subsequent periodic AFCDCs.</p> <p>As mentioned previously, the newly implemented AIIP initiative set out to support existing access procedures, manage access requirements between CRL and RFLI and secure safety critical resources is in place. A dedicated team has been established to tackle access challenges across various workstreams and has achieved reassuring success with access improvement which is being utilised. Further improvements are expected through close out of targeted actions.</p> <p>As part of the outstanding Maintenance Bridge Works workstream, CRL has defined the work to be completed in the Trial Running plan including Tier 1 work within the Blockade. An agreement has been reached between CRL and RFLI on how the work will be divided, and resources allocated. RFLI is in the process of defining the Maintenance Strategy, however, these works are not expected to impact on the revised Trial Operations target date of [REDACTED].</p> <p>While CRL understands the Project Representative’s concern regarding the pace at which critical scope items have transitioned from agreement to readiness for implementation, CRL holds the opinion that decisions on such matters cannot be rushed. It is important to note that none of the critical items identified as ‘critical’ for Trial Operations are delaying the schedule. Of the</p>
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		<p>original 13 items identified as critical for Trial Operations, eight have been closed out and are now being delivered as part of the programme; however, two additional items have been added. The remaining seven are being tracked weekly with operational mitigations if they are not delivered by Trial Operations.</p> <p>As stated previously, the vehicle for aligning works to the GWC and RWT through the PCP is now in place. The PCP along with other relevant stakeholders agree where scope should be allocated for delivery through SAS.</p> <p>The flow of work from the pipeline of the scope book, through filtering meetings into the PCP for agreement to proceed, and final approval to deliver the work through the approved mechanisms after financial agreement, has been obtained allows work to be prioritised, filtered and progressed in quick succession.</p> <p>Work classified as instructed or in the baseline is being progressed as agreed through [REDACTED] or into SAS for the attention of GWC or RWT. A programme wide delivery model is currently being developed. This will align all delivery functions and work reviews, so it is clear who is delivering what, and by when.</p> <p>Any critical scope is being prioritised where possible and the GWC is being engaged to maximise capacity. Although there is an element of [REDACTED], several operational workarounds are being investigated with engagement from the IMs. This will allow the GWC to resource work where possible.</p>
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	<ul style="list-style-type: none"> • Unforeseen signalling software deployment issues, insufficient reliability growth and poor mileage accumulation, remain significant risks to the start of Stage 3 Passenger Service; • The Stage 3 Passenger Service opening window cannot be validated, nor impacts upon Stage 4/5 opening understood, until DCS v1.2 is available. 	<p>Although inadequate reliability growth and below average cumulative mileage are programme concerns that CRL does not trivialise, it is delay to the ELR100 signalling software commissioning that remains the overarching factor impacting on delivery of the Programme and Stage 3 Passenger Service. Therefore, the impact of the delay to the ELR100 signalling software commissioning required for the commencement of Trial Operations has been actualised and incorporated into the Deterministic Programme Baseline1.2 update.</p> <p>The probabilistic QSRA model has been reviewed and tested against the key programme risks assessed on a heuristic basis showing a potential range of impacts and influence on the P50 date. This has been discussed with CRL Executive team, and mitigations have been agreed as required.</p> <p>CRL acknowledges the Project Representative’s concerns regarding Stage 3 Passenger Service opening and the impact this bears on Stage 4 and Stage 5 opening. The pre-existing core schedule logic in the DCS1.1 and the latest access plan through to the end of Trial Operations has been approved by the Commissioner. It reflects the delay to ELR100 signalling software which is the precursor to the commencement of Trial Operations and Passenger Service thereafter. Analysis to date suggests that the Elizabeth line Passenger Service remains on track to commence within the reported envelope of [REDACTED]. This has been supported by an</p>
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		<p>initial QSRA assessment. [REDACTED] is being targeted for a draft of the Programme Baseline 1.2 outcomes. This will include updates for the Stage 4 and Stage 5 programmes.</p>
<p>Health & Safety</p>	<p>Four High Potential Near Misses occurred in Period 2; two were related to possessions and electrical isolations. The Safety Performance Indicator decreased slightly, although the overall indicators remain within those set by the Programme. Control of safe access to the railway continues to be the highest safety priority for the management teams. Across the CRL sites, few new Covid-19 cases are being realised.</p>	<p>CRL notes the Project Representative’s comments regarding Health and Safety performance in Period 2 as accurate. CRL agrees with the Project Representative’s comments in relation to the low number of new COVID-19 cases being reported across sites.</p>
<p>Programme Overview: Schedule</p>	<p>Scope workshops continued to clarify ownership, timelines for delivery, and the impact on Trial Operations, Stage 3 Passenger Service and Stages 4/5. Timely delivery will influence the number of Operational Restrictions necessary and is an important consideration for the IM. The outstanding critical scope will need to be included by CRL in DCS v1.2 with the commercial mechanisms for delivery confirmed and impact on schedule and cost determined.</p> <p>[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]</p>	<p>CRL concurs with the Project Representative’s assessment scope workshops in relation to the Elizabeth line delivery stages. Any critical scope is being prioritised where possible and the GWC is being engaged to see how best to maximise their capacity. Although there is an element of [REDACTED] [REDACTED] [REDACTED] that will allow the GWC to resource work where possible.</p>

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	<p>CRL continues to finalise the update to DCS v1.2. This process has become more challenging due to: uncertainty with ELR100 delivery, completion of the TVS which is impacted by access difficulties, an agreed approach to Asset Data for Bond Street and Canary Wharf Stations, the provision of contingency for STT, and assessment of reliability growth. A determining factor is confirmation in early June 2021 of the timing of delivery for ELR100. An 8-week delay is expected to be confirmed which will require the second blockade to be moved [REDACTED]. The primary purpose of this blockade is to complete all TVS scope and ELR100 software installation and assurance.</p> <p>Currently, [REDACTED] does not support the delivery date for Bond Street Station in [REDACTED], and the TVS suppliers schedule shows completion in [REDACTED]. These dates may need to be accelerated to mitigate delays to target dates for the start of Trial Operations. Supply chain support to DCS v1.2 under development is unlikely to be achieved before [REDACTED].</p>	<p>As mentioned previously, the pre-existing core schedule logic in the DCS1.1 and the latest access plan through to the end of Trial Operations has been approved by the Commissioner. This takes into consideration the delay to ELR100 signalling software commissioning which is the key pressure point on the Deterministic schedule DCS1.1 Baseline and the overarching factor that will inform the Programme Baseline1.2 update given the cumulative impact this presents to Trial Operations and beyond. Emerging concerns will be reviewed and mitigated to support the programme achieving future milestones as planned within the Programme Baseline 1.2 development exercise.</p> <p>CRL notes the Project Representative’s comments in the period regarding the contradiction between [REDACTED] delivery works and delivery of Bond Street station. The teams are working collaboratively to support access and delivery with [REDACTED]. Mitigations are being evaluated for potential alternatives. As CRL understands it – the issue is GSMR, which the team is focusing on.</p>
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<p>Commercial and Risk</p>	<p>The adoption of realistic productivity assumptions will be important in finalising DCS v1.2. Given the low productivity achieved to date, there is no basis for assuming improved levels until the Access Improvement Plan is implemented. It is evident that the supply chain is assuming varying degrees of access improvement, with some believing that access will return to pre- ROGS transition levels; if incorrect, this assumption may affect future delivery dates.</p> <p>CRL’s previously excluded cost pressures have been assessed in Period 2 for inclusion in its AFCDC. Our initial expectation of CRL’s AFCDC for Period 2 was [REDACTED]. However, a revised proposed forecast of £15,939m was</p>	<p>Integral to the Programme Baseline1.2 exercise is the critical trace impacting works to be completed in the ongoing Blockade with specific work associated with ELR100 signalling software, TVS Windows 10 migration, BT Turret Commissioning and Bringing into Use at Bond Street station works being undertaken in the [REDACTED] Blockade. This work is being planned on a specific detailed basis with individual work identified. There has been a slow start to the Blockade, however at the time of writing, the actual productivity rate has accelerated to 93% total productivity to date and 80% total complete, with any issues being tracked to closure through the Central Blockade Management team.</p> <p>Work within the stations will carry on in line with pre-ROGS workstreams until SC3ROGS milestones are met.</p> <p>The EHIP workstream provides the ability for RFLI to carry out necessary maintenance work and the initiatives identified are being quantified for the increase in engineering hours that are being delivered with specific targets for entry into Trial Operations and Revenue Service clearly identified. Progress towards those targets is measured on a regular basis.</p> <p>In Period 2, CRL reported £29m increase to last period’s AFCDC driven by a provision added for scope elements identified through the scope book reconciliation exercise. Items identified through this exercise will continue to be reviewed and</p>
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<p>Organisation</p>	<p>subsequently presented at EPPR and was endorsed at ELDG. We have not had the opportunity to review these updated figures in this Period 2 report but will do so in our Period 3 report.</p> <p>It is likely that cost pressures will continue to emerge as CRL finalises its DCS v1.2 scope, schedule and risk reviews. While this process continues, uncertainty remains and the AFCDC cannot be reliably underpinned or assured. We are observing a corresponding increase to the [REDACTED], as CRL continues with its DCS v1.2 re-baseline and progressively resolves cost pressures, together with the outcome of schedule slippage, scope increase, prolongation and access delays. We are concerned that CRL's prolongation risk provision will be fully committed due to ongoing access delays and low productivity and that, while risk mitigations have been implemented, new risks and scope continue to emerge.</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>CRL will progress with an update of its management systems over the course of the next few periods, ahead of an ISO9001 review in</p>	<p>verified with relevant parties before constituting an approved change and crystallising into actual cost. The period total AFCDC was £15,939m.</p> <p>As stated previously, delivering on or close to our deterministic programme remains the single biggest financial opportunity. Working towards this and making decisions whilst simultaneously considering financial implications will continue to drive CRL towards the best possible outcome. In addition to the DCS update, work to identify the lowest cost to go is to be undertaken, key areas for review include [REDACTED].</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>CRL is currently reviewing its management system with particular focus on the ISO9001 audit in August 2021 and readiness for Trial Operations later this year. A Management Systems</p>
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	<p>September 2021 and before the organisation demobilises at [REDACTED].</p> <p>In Period 1, CRL’s team was smaller than the January 2021 Workforce Plan forecast. In Period 2, CRL’s Indirect resource level was expected to be 1,125 FTE, driven by 68 roles being filled, and offset by 5 that were due to end.</p> <p>[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]</p> <p>Resource concerns continue to be identified across the Programme, including: front-line delivery resources leaving critical areas of the supply chain (e.g. signalling); supplier-certified safety competent resources for the blockade works; and RfLI’s limited assurance, maintenance, and access control functions (which the ACU is seeking to address, but for which ‘additional’ resources are required). We remain concerned at the impact that resources leaving the Programme will have on progress.</p>	<p>Transition Taskforce has been implemented to create mechanisms to align management systems across LU, MTR, NR, RFLI and CRL. Workstreams are ongoing in completing Safety and Engineering Impact Assessments for RFLI documents issued to CRL and a Gap Analysis for respective management systems such as Crossrail Management System and Rail Link (RFLI management system). The latest Business plan includes organisation demobilisation dates [REDACTED].</p> <p>CRL is currently conducting an exercise to review all vacant roles, not just those with historical start dates. This may offer an opportunity for savings; however, this has not yet been calculated.</p> <p>CRL is aware of the importance of securing competent skills and retaining key resources to complete the Programme. [REDACTED] [REDACTED] [REDACTED]</p>
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<p>Stage 3 Trial Running, Trial Operations and Passenger Service</p>	<p>Since the achievement of ROGS in March 2021, the control and implementation of access to the railway under the RfLI Rule Book has proved extremely difficult and posed the greatest safety risk to the Programme. A contributing factor has been the size of the RfLI organisation which, while appropriate for a steady state railway, has been unable to cope with the volume of Programme completion works. A dedicated ACU has been established, and both CRL and RfLI are working collaboratively to address the access issue. The ACU needs to rapidly expand in size if it is to quickly make the necessary significant improvements. However, it is a concern that no date has been confirmed for when the Access Improvement Plan will be implemented. The cost for the additional ACU resources has not been anticipated, but it is seen by CRL management as an imperative expenditure, to mitigate further costs and value lost due to low productivity.</p>	<p>The Project Representative is accurate to state the challenges CRL has experienced across the Programme since transitioning to a ROGS environment. These challenges have been principally related to access. As previously stated, the newly implemented AIIP initiative set out to support existing access procedures and manage access requirements between RfLI and CRL has achieved some success with access improvement with actions in place to further improve access outcomes for the remaining Trial Running period. Once implemented after the ongoing Blockade is complete, the ACU will bring together the Integrated Delivery Programme Committee (IDPC), Operations Delivery Managers, AIIP and the EHIP to provide direct assistance to the planning teams in the areas of Safety Critical Resourcing, Continuous Improvement and Secure Room Access. Until Passenger Service is achieved, the ACU's overarching role will work to deconflict the IDPC and Works Planning teams to enable effective joint collaboration ensuring prioritisation is applied consistently so that wider consequences are understood. The intention is to mitigate the incremental cost for the additional ACU resources. The activities from the Programme Baseline update will provide a more up to date view on funding requirements, furthermore, the exercise will to identify whether the lowest cost to go may offer savings.</p>
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	<p>The establishment of control over the Maintenance Bridging Plan and all other preventative maintenance work is important for RfLI and CRL. Both organisations have experienced difficulties with access, isolations and possessions, which have impacted maintenance productivity. With maintenance works productivity levels less than forecast, ensuring asset maintenance compliance is essential for the achievement of Trial Operations. The challenge will become greater as railway operations intensify after the start of Trial Operations, requiring an increase in levels of maintenance. There is a risk that Operational Restrictions are imposed or, at worse, trains stop running, if assets are not compliant; both scenarios will impact mileage growth.</p> <p>System Testing with the Train (STT) started in the period, although success has been mixed, with test failures, logistical challenges and opportunities lost to higher priority works. The STT completion rate of approximately 50% is below expectation. While there are recent positive signs of an improvement, the Staging Plan for Trial Running is likely to be updated to allow contingency for re-tests to provide float. Slippage from CRL’s DCS v1.1 baseline deterministic date for the start of Trial Operations of [REDACTED] will provide this schedule contingency opportunity for STT, but this will need to be balanced against other demands, such as for maintenance works and 12 TPH running.</p>	<p>As part of the outstanding Maintenance Bridge Works workstream, CRL defined the work to be completed in Trial Running plan including Tier 1 work within the ongoing Blockade. An agreement has been reached between CRL and RFL on how the work will be divided and how resources will be allocated.</p> <p>Option J6 Staging Plan which is the latest access delivery plan to the end of Trial Operations has been presented to CRL Executive team and proposed for inclusion in the Programme Baseline1.2 update. The STT performance has been re-baselined in recognition of this newly agreed Trial Running Plan option, Option J6. Any concerns related to maintenance or 12TPH are actively being discussed and mitigations put in place as part of the weekly Passenger Service Steering Group meetings.</p>
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	<p>The ramp-up to 8 TPH trials started on 7 June 2021, with 12 TPH forecast for mid-July 2021. However, against DCS v1.1, overall mileage growth is down by approximately 70%. Completion of the Central Section competence programme for MTREL drivers is currently behind plan; while recovery was forecast in time for the start of 8 TPH trials, this did not materialise.</p> <p>Improvements to isolation and possession management are being addressed through the Engineering Hours Improvement Programme (EHIP). This Programme is being managed as an independent workstream and implementation is likely to have a significant cost impact. While a detailed plan to completion is to be finalised, forecast completion in [REDACTED] will lead to an improvement in maintenance periods; until then, it is likely some Operational Restrictions will be required.</p> <p>With ELR100 deployment delayed by up to 8 weeks, we believe that CRL’s target date for the start of Trial Operations on [REDACTED] will now not be achieved; it is likely that CRL will work to a deterministic date [REDACTED] [REDACTED] in finalising DCS v1.2.</p>	<p>The ramp up of Trial Running to 8TPH commenced in accordance with the revised programme on 7 June 2021, as stated by the Project Representative. Driver Competency is being managed to provide enough drivers to commence 12 TPH in mid-July in line with the revised DCS1.1 schedule incorporating the 'J6' Trial Running plan. The delay to the commencement of Trial Operations to [REDACTED] [REDACTED] will facilitate the achievement of more mileage accumulation.</p> <p>The EHIP is ongoing to establish a stable maintenance plan that includes refinement of metrics to provide clarity on what is expected to change and the timings of these changes. Any benefits will be fed into the maintenance plan with some EHIP benefits being delivered early such as Auto Switching in the Blockade. The planned maintenance backlog burndown versus the rate that is actually achieved is also being monitored and will be issued weekly, based on the verified maintenance recovery plan per agreed delivery allocation.</p> <p>CRL concurs with the Project Representative’s assessment of the impact delays that ELR100 commissioning will have on commencement of Trial Operations. Other baseline DCS1.1 Cardinal Event Dates remain unchanged, with the exception of Trial Running ramp up to 12TPH now scheduled for [REDACTED]; commission of ELR100 software now scheduled for [REDACTED]</p>
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<p>Stations Commissioning and Handover</p>	<p>The deterministic date for Stage 3 Opening is unachievable due to a combination of factors identified in this report. CRL’s P50 date of April 2022 is subject to validation through a QSRA on DCS v1.2 when it is fully developed and finalised. However, CRL is likely to drive towards a Stage 3 Opening date as early as possible in [REDACTED].</p> <p>Stations progress has been severely constrained by difficulties with access in the period. This is starting to improve from a position of approximately 10% success rate against plan in 8 weeks. However, reliable access remains a risk to stations delivery and completion, particularly at Canary Wharf, Paddington and Bond Street Stations. Late receipt of Asset Data by RfLI poses the greatest risk to stations completion. While CRL has been hampered by access, a test case is under development for Woolwich Station to maintain the Asset Data delivery date of 25 June 2021 for SC3 ROGS/BIU. While this may meet some of the IMs expectations, it is likely that maintenance support will be required after handover, with additional associated costs. Liverpool Street</p>	<p>[REDACTED] and commencement of Trial Operations, with a revised target date of [REDACTED].</p> <p>While CRL concurs with the Project Representative that a number of challenges has reduced CRL’s productivity rate, the overriding pressure point in delivery of the Elizabeth line is the delay encountered to the commissioning of ELR100 signalling software. Analysis to date suggests that Stage 3 opening of the Elizabeth line remains on track to commence within the reported P50 envelope of [REDACTED]. This has been supported by an initial QSRA assessment carried out on a high-level programme schedule that included the revised programme target dates.</p> <p>Stations’ teams are working on the asset data challenge and aligning with the IMs to ensure a successful handover takes place on the scheduled target dates. Mitigations are being monitored, but this may significantly reduce potential project durations for Tier1s at the stations if handover were to be delayed. Woolwich station achieved handover to RFL on 25 June 2021 and on 5 July 2021, Liverpool Street station was successfully handed over to London Underground. With five of the nine central section stations now handed over, this is a crucial step towards readiness for Trial Operations.</p>
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	<p>Station is on target for SC3 ROGS/BIU achievement on 3 July 2021.</p> <p>Planning commenced for the first 10-day blockade starting on 21 June 2021. CRL is planning to deliver and complete all the outstanding trace dependent EOWs for the Routeway and Stations. Bond Street Station will be the exception, with approximately 30 EOWs remaining. Agreement on the processes for working under the ROGS Rule Book in the blockade will be required between CRL and RfLI. A key assumption is that access will be improved during the blockade, in order to maximise delivery efficiency. However, it is unlikely that the same productivity levels will be realised in June 2021 as seen previously. This is principally because the re-planning of lost works under the ROGS Rule Book is more difficult than under the Construction Railway Rule Book. A significant factor will also be the availability of safety-qualified competent resources.</p> <p>Considerable work remains to achieve full handover to the IMs (both LU and RfLI) after the achievement of SC3 ROGS/BIU. Generally, all stations require additional periods of up to 3 months for the completion of full handover, and a further 3 months for contract completion. [REDACTED] [REDACTED] [REDACTED]</p>	<p>Critical trace impacting work are planned to be completed in the ongoing Blockade with specific work associated with ELR100 signalling software, TVS Windows 10 migration, BT Turret Commissioning and Bringing-Into-Use at Bond Street station being conducted in the later Blockade. This work is being planned on a specific detailed basis with individual work identified. Although there has been a slow start to the ongoing Blockade, at the time of writing, the productivity rate has accelerated to approximately 93% productivity of planned requirements with Stations achieving 99% productivity. The overall total complete stands at 80%. Work within the stations will proceed in line with pre-ROGS schedules until SC3ROGS milestones are met.</p> <p>CRL concurs with the Project Representative’s assessment of post-SC3ROGS/BIU milestone in order to achieve full handover. CRL’s execution strategy is to deliver any scope required for Trial Operations or Revenue Service within the initial 90 days post SC3ROGS. There are specific activities that fall beyond SC3ROGS as a matter of inevitability. However, all required works supporting Trial Operations and Revenue Service are planned to be complete in readiness for these phases to commence.</p>
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<p>Assurance</p>	<p>The Bond Street Station [REDACTED] date for SC2 requires mitigation to recover a [REDACTED] [REDACTED] and is anticipated to slip into mid-September 2021. Achievement of the SC3 ROGS date in [REDACTED] is also likely to be a challenge, as currently the supply chain cannot support delivery to this date. CRL's pursuit of [REDACTED] for SC3 ROGS is likely to result in partial functionality with extended support after achievement. Canary Wharf Station requires completion of all remaining physical works, as well as assurance and a substantial number of Trial Operations EOWs. In order to hold the planned date of [REDACTED] for SC3 ROGS/BIU, recovery of [REDACTED] is required. It is likely that both Canary Wharf and Bond Street Stations will target mid-September 2021 for completion, delayed from their DCS v1.1 deterministic date.</p> <p>A delay to the second blockade to [REDACTED] will provide more time for the delivery of assurance evidence for stations. However, there remains a substantial stations assurance workload due to the overall number of EOWs that remain outstanding.</p>	<p>The Project Representative is correct in its assessment of Canary Wharf and Bond Street stations' ROGS target dates slipping to [REDACTED]. However, these dates remain within the P50/P80 schedule dates in the DCS1.1 schedule.</p> <p>CRL concurs with the Project Representative's assessment of assurance timescales in relation to stations brought about by a delay to the [REDACTED] Blockade. However, the assurance challenge is driven primarily by the stations Acceptance Certificates which now have a good focussed effort to complete. EOWs to be completed beyond Trial Operations and Passenger Service may affect SJ dependencies, however, CRL expect the risk impact to be minor and anticipate StEJs to be agreed in order to allow SJ endorsement for Trial Operations and beyond. To de-risk this, StEJs</p>
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<p>Future Stages</p>	<p>The delivery of integrated signalling and rolling stock safety assurance for ELR100 will be a challenge, even if the second blockade moves. ELR11X software is scheduled for release in late [REDACTED] and will incorporate fixes for any faults arising from ELR100, and a track database update to take account of planned NR works on the GWML in its [REDACTED] Blockade. Time must be allowed for train testing and route proving following the deployment of ELR11X, before Passenger Service can commence.</p> <p>Clarity is required on the implementation of Stage 4/5, planning for which does not appear to be receiving sufficient attention. This might be down to the limited availability of the Programme team which has a priority focus on Stage 3. Demonstration of reliability growth and delivery certainty of signalling software such as ELR200 will help to provide confidence in advance of the</p>	<p>re-commence in July with up to three per week to ensure there is optimum alignment between CRL and RFL and LU.</p> <p>The Project Representative is correct to point out the potential assurance challenges in relation to ELR100 software and its iterations and CRL agrees with this point, however, CRL has performed this activity multiple times in the past to which the Project Representative is aware of. ELR100 is a large build with many changes. A progressive assurance approach has been agreed to clarify the detailed handover of assurance deliverables from Siemens to Alstom and to demand early release of Siemens ESJ prior to the [REDACTED] Blockade. This will allow the SJ to be developed and familiarised prior to the completion of remaining evidence during the Blockade. The risk of ELR11X is shared with NR in that the release is required to align with NR commissioning changes to the approach to CRL outside Paddington station. The need for more testing time to run a test train is a known issue at this time and is being worked on by CRL and NR.</p> <p>The option for implementation in [REDACTED] has been defined between TfL and MTR based on combining [REDACTED] followed by [REDACTED] through running introduced later in the timetable period, or straight to [REDACTED]. Selected option will depend, <i>inter alia</i>, on the delivery strategy agreed with Siemens for the</p>
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	<p>planned implementation of Stage 4/5. [REDACTED] [REDACTED]. It is likely that, with potential slippage against the deterministic date for Stage 3 Opening, the opening for [REDACTED] will slip from [REDACTED] to [REDACTED].</p>	<p>ELR200 CBTC upgrade. This is the subject of ongoing senior management discussions to be concluded in July. The timetable for [REDACTED] which will accommodate either of the options has been agreed in principle [REDACTED] subject to TfL and Sponsor governance which includes ELC on 15 July 2021. Fleet deployment planning for these options is being worked at weekly TfL/MTR Fleet planning meetings. A monthly TfL/CRL/MTREI/NR Stage 5 Elizabeth line Oversight Group has been convened, to oversee business readiness for the [REDACTED]. The first meeting is scheduled for [REDACTED].</p>
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