PROGRAMME DIRECTORATE

Crossrail - Programme Governance

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Draft 1.0	First draft for technical review (24th December 2015)
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Draft 2.0	Draft for issue (March 2018)

Contents

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1 Purpose

The purpose of this document is to describe Crossrail's governance arrangements with a particular focus on the programme governance framework used to control the leadership, decision-making, reporting and management of the Crossrail Project to achieve its objective to deliver an integrated end-to-end railway.

2 Scope

This document applies to all the individuals and forums identified as necessary to deliver the Crossrail Project in accordance with the Delivery Strategy. It is owned by the Programme Directorate and will be reviewed whenever an organisational change occurs, or as otherwise required.

It should be noted that names and titles of those in attendance at each forum may change in between each review of this document.

3 Crossrail Limited Governance Principles

The Crossrail Project is a very large and complex programme with tight timescales. Its governance must be clear where responsibility and accountability rests, and how decisions are made by both governing forums and individuals.

The Scheme of Authorities, as established by the Crossrail Board, sets out delegated authority levels for the corporate governance structure forums (that is, the Board, its Committees and Subcommittees) as well as the executive directors of CRL, and other post holders within their areas of accountability.

Programme governance forums that sit under the corporate governance structure, which in aggregate constitute the Crossrail programme governance structure, have clear terms of reference to establish their role, membership, frequency and administration.

In addition, the roles and areas of responsibility of individuals, not already established by the Scheme of Authorities or within the governing forums' terms of reference, are set out in job descriptions. These include, where appropriate, the delegated authority the individual possesses for the discharge of the functions of the Company for which they are responsible, which is generally delegated to the lowest level considered consistent with adequate control.

The programme governance forums comprised of these individuals facilitate the delivery of CRL's obligations. Ultimately delivery will be by Industry Partners, and CRL's contractors, so effective governance must extend to management of those in a manner, and to an extent, appropriate to each relationship. This is consistent with the needs of a programme of the scale and complexity of Crossrail.

The principles in establishing programme governance forums are that:

- Decisions must be informed by the right breadth of scope at the right subsidiary level
- However, decisions can only be made by individuals with the appropriate delegated authority
- Subsidiary forums otherwise can make recommendations only
- Forums must form a clear and simple hierarchy:
  - Each must have a clear purpose and objectives
  - Membership will be established against these – it should be clear to all why they are there
  - Escalations of issues for decisions, where necessary, will be through a clearly defined route
  - Gaps or overlaps of scope are to be avoided
  - Business will be structured, efficient, recordable and traceable
  - Reporting will be simple, accurate and timely (even with complex inputs from many sources)
  - Terms of reference will be clear, concise, transparent, in a standard Crossrail format, and widely accessible, as well as approved by the more senior forum

Any changes to the programme governance structure, including the establishment or disbanding of forums, will be notified to the Programme Directorate.

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4   Crossrail Organisation

CRL is the nominated entity appointed and funded by the Sponsors to manage and implement the Crossrail Project as defined in the Project Development Agreement (PDA). The relationship between the Sponsors, the Board, its Committees and Sub-Committees, is described in the Delivery Strategy and Management Plan: Volume 1 - Corporate, Support & Specialist Function Directorates.

4.1   Crossrail Board and Committees

The key governing documents that set out requirements for Crossrail's corporate governance structure are the TfL Shareholder Agreement and Crossrail's Memorandum and Articles of Association, adopted when CRL became a wholly owned subsidiary of TfL.

The CRL Board comprises a majority of non-executive directors (seven including the Chair) as well as three executive directors; the CEO, the Finance Director and the Programme Director. Crossrail complies with the main principles of the UK Corporate Governance Code.

The CRL Board is Crossrail's ultimate governing body. It takes high-level decisions and is responsible for ensuring that CRL's organisation, processes and resources are appropriate to deliver the Crossrail Project. Under the terms of the TfL Shareholder Agreement some decisions are reserved for the Sponsors (TfL and DfT). The Board has its own guidelines which set out the arrangements for the conduct of its business.

The CRL Board has established subordinate bodies "Board Committees", one of which is the Executive and Investment Committee compromising executives only. It meets formally every period.
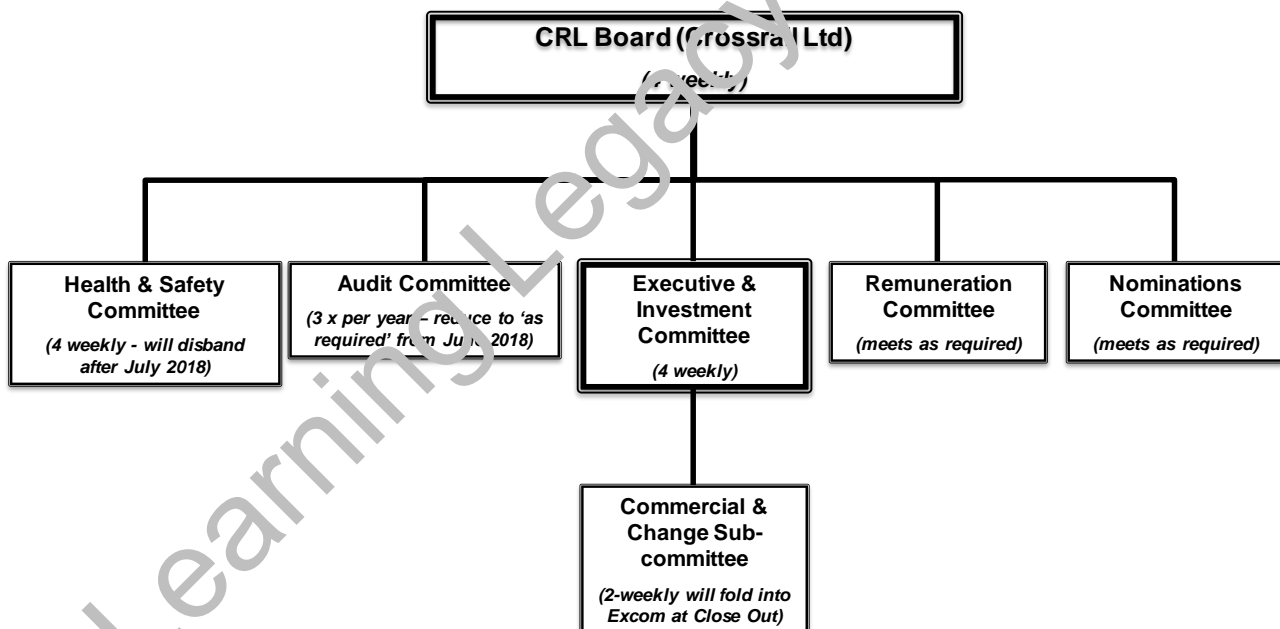
Figure 1 – CRL corporate governance (January 2018)

4.2   Executive and Investment Committee and Sub-committees

As of January 2018, there is only the Commercial and Change Sub Committee that reports to the Executive and Investment Committee (Excom), which makes decisions on a range of matters relating to the overall budget in accordance with its powers as set out in the Scheme of Authorities. This will fold into Excom once the Crossrail Close-Out Directorate takes effect on 1st September 2018.

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5   Crossrail Programme Management

5.1   What is programme management?

Programme management is the coordinated implementation of a set of related projects and transformation activities in order to achieve the outcomes required to realise benefits of strategic importance.

During the lifecycle of a programme a series of projects will be initiated, delivered and closed. Programme management complements project management by providing an umbrella under which projects can be coordinated, and their outputs and capability transitioned into operation, whilst maintaining the performance and effectiveness of delivery. It integrates and reconciles multiple interdependencies to manage competing demands by the projects through providing a context and control framework for the overall programme.

5.2   What is programme governance?

Programme governance is the control framework of authorities and forums through which a programme delivers its objectives whilst remaining within corporate visibility and control.

A programme needs clear and transparent governance if it is to be successful. Programme management is most effective when issues are debated freely and risks evaluated openly.

5.3   Programme management at Crossrail

The PDA (Clause 6.2) requires CRL to undertake overall programme management (defined as the programme of work to deliver the railway network) in order to organise, manage and coordinate the delivery of each of the different Elements of the CRL Project.

Crossrail is a world class programme that uses leading industry best-practice in order to deliver a safe operable integrated end-to-end railway, on time and on budget, as required by the Sponsors.

As Crossrail is a very large and complex programme, it is necessary to:

1. Cascade responsibility for the efficient delivery of Crossrail's obligations to additional subsidiary competent individuals and forums beneath the "corporate" governance level of the CRL Board, its committees and sub-committees (and describe the same)

2. Articulate how Crossrail exercises programme management through a Crossrail Programme Governance Framework in a single governance document (in a clear and consistent format)

3. Describe how the Crossrail programme leadership is supported in directing successful delivery of the Sponsors Requirements in accordance with the CRL Delivery Strategy

5.4   Programme Leadership at Crossrail

The Programme Leadership is responsible to the Executive and Investment Committee for:

*   Reviewing and monitoring implementation of the CRL Delivery Strategy
*   Developing the delegation strategy required to deliver the Programme
*   Reviewing and monitoring the Programme delivery plans and budgets (in line with the PDA)
*   Advising the CEO and functional delivery teams on the strategic approach to significant issues inclusive of: Delivery strategy; Property; Design; Procurement; Conflicts of Interest; Construction; Security; Stakeholder management; Programme controls, testing and Commissioning.
*   Overseeing an effective programme governance structure and assurance process

The Programme Director is responsible for both establishing and maintaining governance, and ensuring successful delivery of the new capabilities through the projects in accordance with the CRL Delivery Strategy.
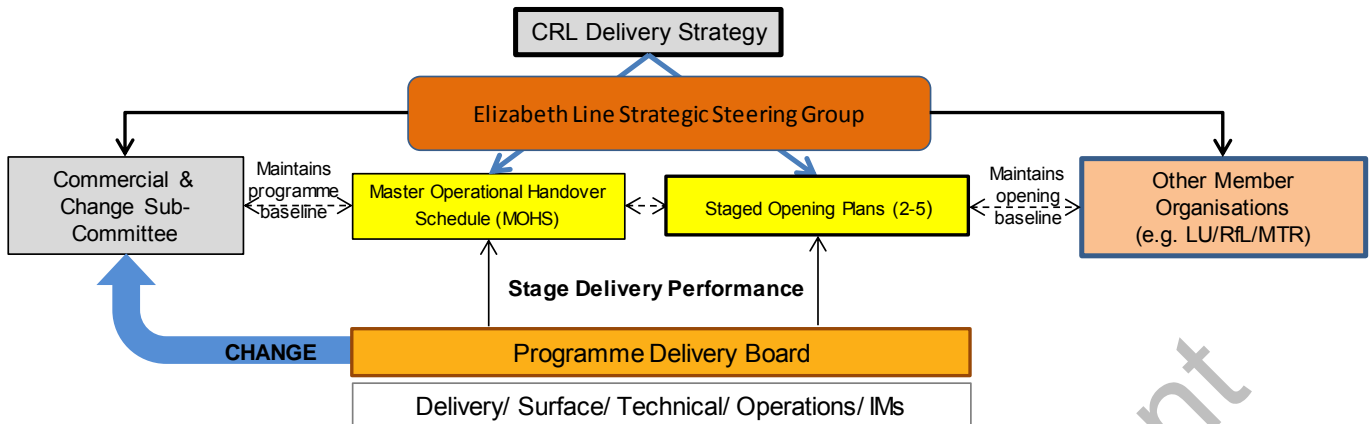
Figure 2 – CRL Programme Management Framework (January 2018)

5.5 Support to the Programme Leadership

The Programme Leadership will be assisted in discharging its responsibilities through support offered by both the Programme Controls and Integration teams to assure that:

1. The overall integrity and coherence of the programme is maintained
2. Strategic drivers are extended into the governance of projects
3. Projects are not detached or misaligned from the CRL Delivery Strategy
4. Risk profiles and thresholds for both the programme and projects are acceptable
5. Decision making on resolving directional issues between interdependent projects are informed both by the latest intelligence, and the CRL Delivery Strategy
6. Focus is maintained on the achievement of the ultimate programme mission

Programme Controls and Integration will collaborate as a single programme team. However, in providing support Programme Controls will:

- Provide functional leadership of all Controls disciplines including Planning, Cost, Risk, Change Control and Cost Verification, Commercial Assurance and Reporting
- Establish and maintain integrated management information to provide key knowledge for all functions at Programme level in a coordinated manner.
- Provide foresight and advice - alongside providing this key information, analysis and reporting - to assist clear decision-making at the programme leadership level.

And the Integration team will:

- Focus on the overall (collective) performance of the railway, not its individual component parts, as organised around the "4 pillars": Collectively Performs; Collectively Safe; Collectively Operable; Collectively Maintainable
- Assure that all functional and physical interfaces perform as the Requirements intend
- Provide guidance on actions to take to deliver the ultimate Crossrail mission of a world-class end-to-end railway, that is ready for revenue operations on time, with the ORR certification and UK/EU authorisations process complete

Both will take the initiative to enhance visibility of programme intelligence at the Programme Leadership level, and will not await requests to do so. This will include highlighting and drawing together common themes from across the CRL project, and proactively making suggestions for improvements in the timely direction of the delivery of the new capabilities required, in accordance with the CRL Delivery Strategy.

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6 Crossrail Governance Map
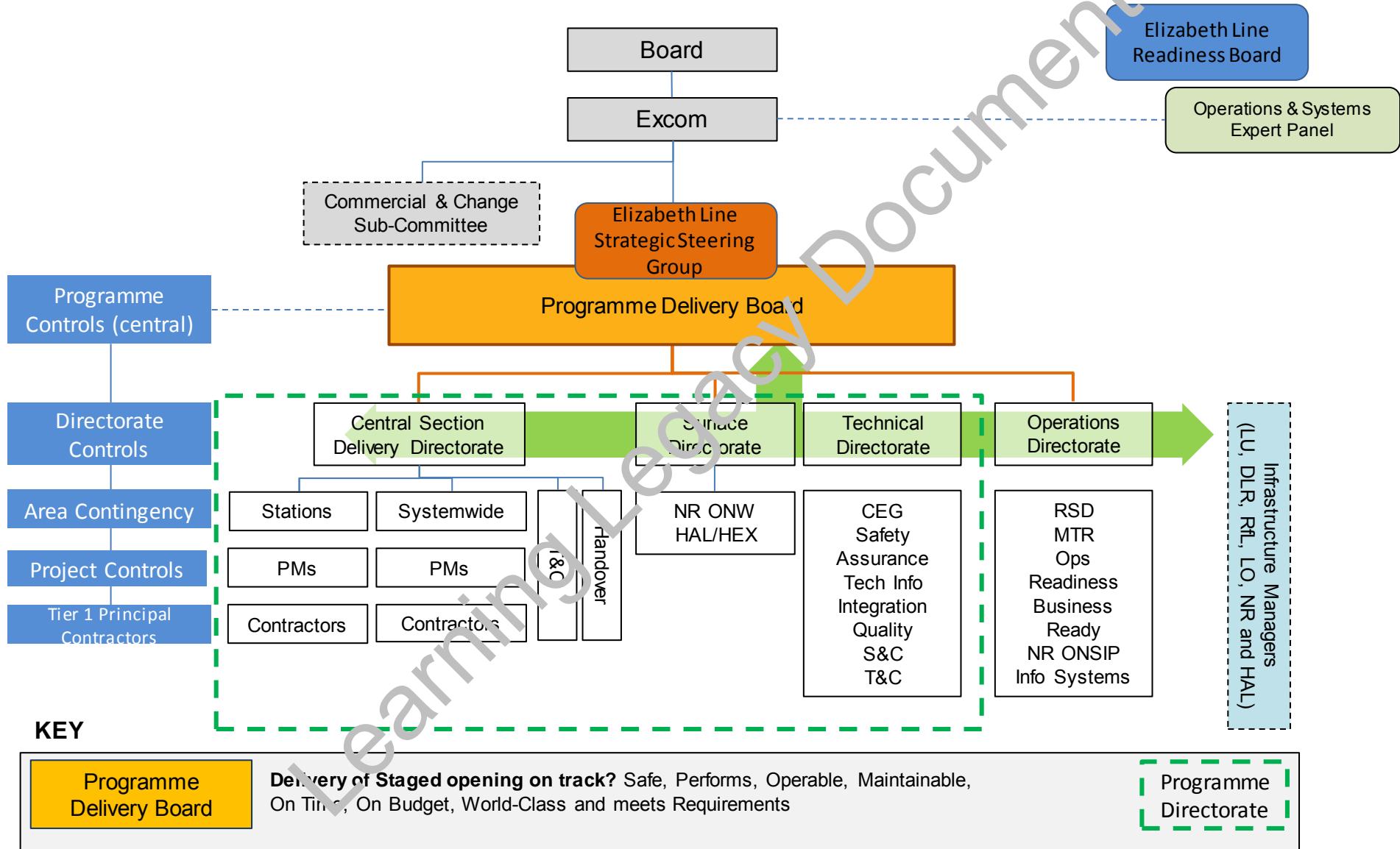
Figure 3 – Crossrail Governance Map

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7 Crossrail Programme - Meetings Map – Tier 1, 2, 3 and 4
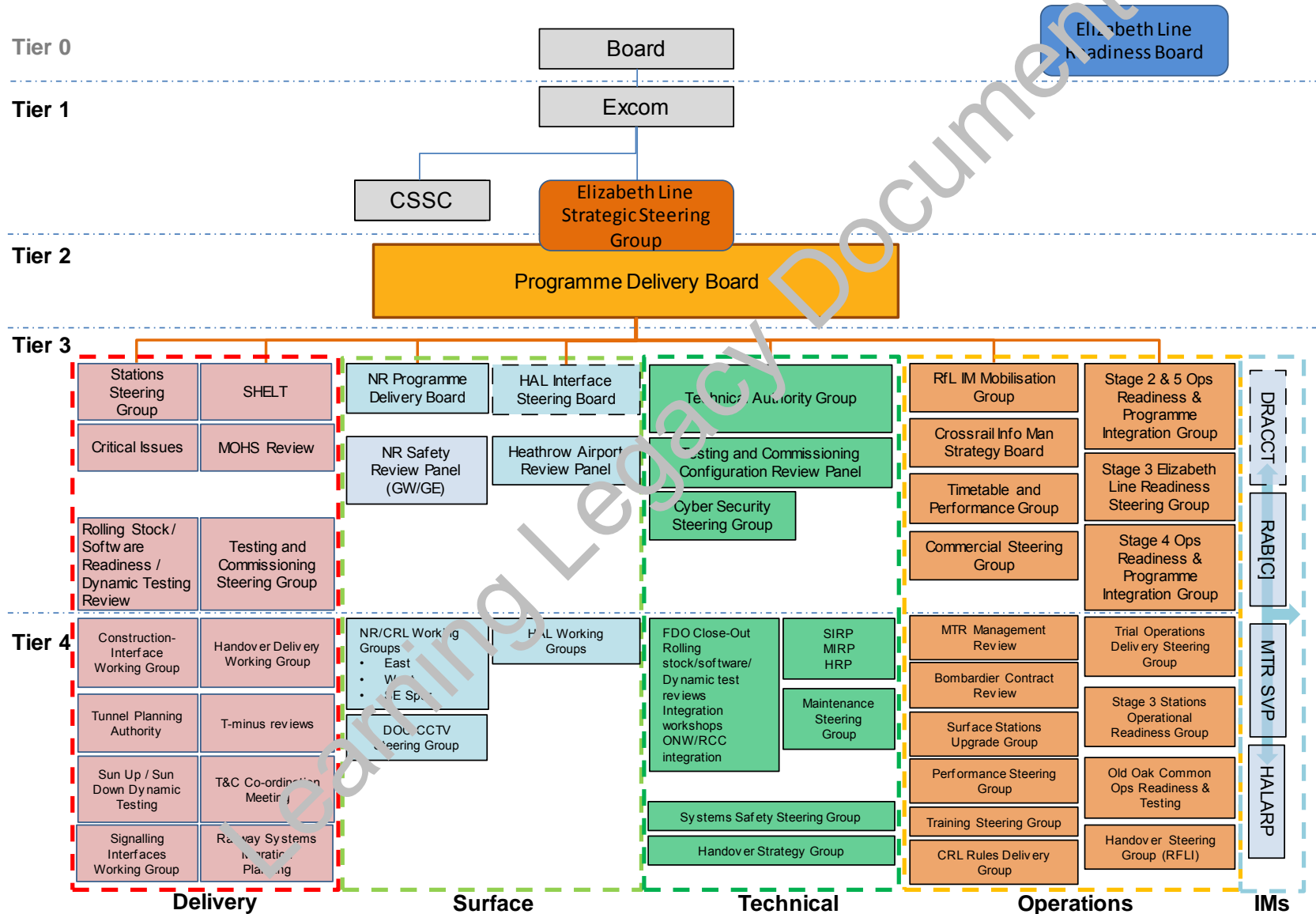
Figure 4 – Crossrail Programme Meetings Map – Tier 1, 2, 3 & 4

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8   Crossrail Tier 2 - Programme-Level Meetings

8.1   Elizabeth Line Strategic Steering Group

8.1.1   Purpose

The purpose of the Elizabeth Line Strategic Steering Group is to respond quickly to any escalated issues identified during the testing and commissioning phase of the Elizabeth Line, up to and including Trial Running, and effectively manage strategic trade-off decisions between the train, infrastructure and operator – with respect to requirements, cost and programme - to best support Stage 3 Opening.

8.1.2   Objectives

The objectives of the Elizabeth Line Strategic Steering Group are to:

- Understand, review and monitor implementation of the CRL Delivery Strategy ↔ PDA during testing and commissioning of the Elizabeth Line using a "one team" approach
- Exercise strategic prioritisation of work across all Elizabeth Line teams to support testing and commissioning using a balanced view of operations, maintenance, safety and performance requirements within the available programme requirements and funding envelope
- Provide a forum to facilitate timely and effective decisions and agreements by and between the member organisations acting through their respective organisations
- Provide reports to the CEO, and Excom, other member organisations, and functional delivery teams when requested, on the strategic approach to significant testing and commissioning issues

8.1.3   Chair

Chair: Programme Director ▉▉▉▉▉▉▉ – until end of testing & commissioning

Deputy Chair   Operations Director ▉▉▉▉▉▉ - after completion of testing & commissioning

8.1.4   Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Programme Director	▉▉▉▉▉▉
RfL	Operations Director	▉▉▉▉▉▉
Crossrail	Technical Director	▉▉▉▉▉
Crossrail	Chief Engineer	▉▉▉▉
Crossrail	Delivery Director	▉▉▉▉
MTR	MTR Crossrail Director	▉▉▉▉▉▉
LU	Director of Customer Service	▉▉▉▉▉▉▉
RfLI	Head of Engineering	▉▉▉▉▉▉
Crossrail	Head of Integration	▉▉▉▉▉
By Invitation Finance Director, ▉▉▉▉▉▉, and other members of Crossrail and the Operators will be invited to attend as required		

8.1.5   Secretariat

▉▉▉▉▉▉ (Head of Integration) or designee will provide the secretariat for this forum.

8.1.6   Quorum

Strategic trade-off decisions cannot be made without the presence of those affected, and the attendance of both the Operations and Programme Directors.

8.1.7   Frequency

Meetings will be held on a periodic basis (every **four** weeks) or as required. The secretariat will maintain a calendar of agreed meeting dates.

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8.1.8 Inputs

Inputs into the Elizabeth Line Strategic Steering Group (ELSSG) will be driven by bespoke structured issues with options for a decision, sourced from the Programme Delivery Board and/or the Testing & Commissioning Steering Group. It will be run by an agenda and it is <u>not</u> to be run by an issues tracker.

8.1.9 Agenda

The agenda of the meeting will vary. The duration of the meeting will typically be no greater than **2 hours**, including:

- Review of any new strategic issues
- Review of progress/resolution in closing existing issues

8.1.10 Outputs

Outputs will be captured by the Secretariat, developed into an action plan and cascaded to the accountable/responsible owners. In addition, the ELSSG will provide reports to Excom and CCSC of any agreed decisions, and their implications.

8.1.11 Governance and Authority

- Decisions and agreements may be made, following review by the Group, by individuals acting on behalf of the member organisations which they represent; in accordance with the authority respectively delegated in each individual by each organisation's governance regime
- Each member organisation will endeavour to ensure that it is represented by an individual vested with sufficient delegated authority, to decide and agree an appropriate resolution of all issues
- The ELSSG shall have the authority to make binding decisions during the testing and commissioning phase
- The ELSSG Secretariat will prepare and issue to member organisations reports of each meeting, including any decisions taken and actions arising
- The threshold for issues that are raised to the ELSSG for review, shall typically be those that pose a threat to the critical path, and/or a substantial cost impact, and/or a CPFR requirement being compromised; resulting in a need for strategic reprioritisation across the programme, infrastructure managers and operators
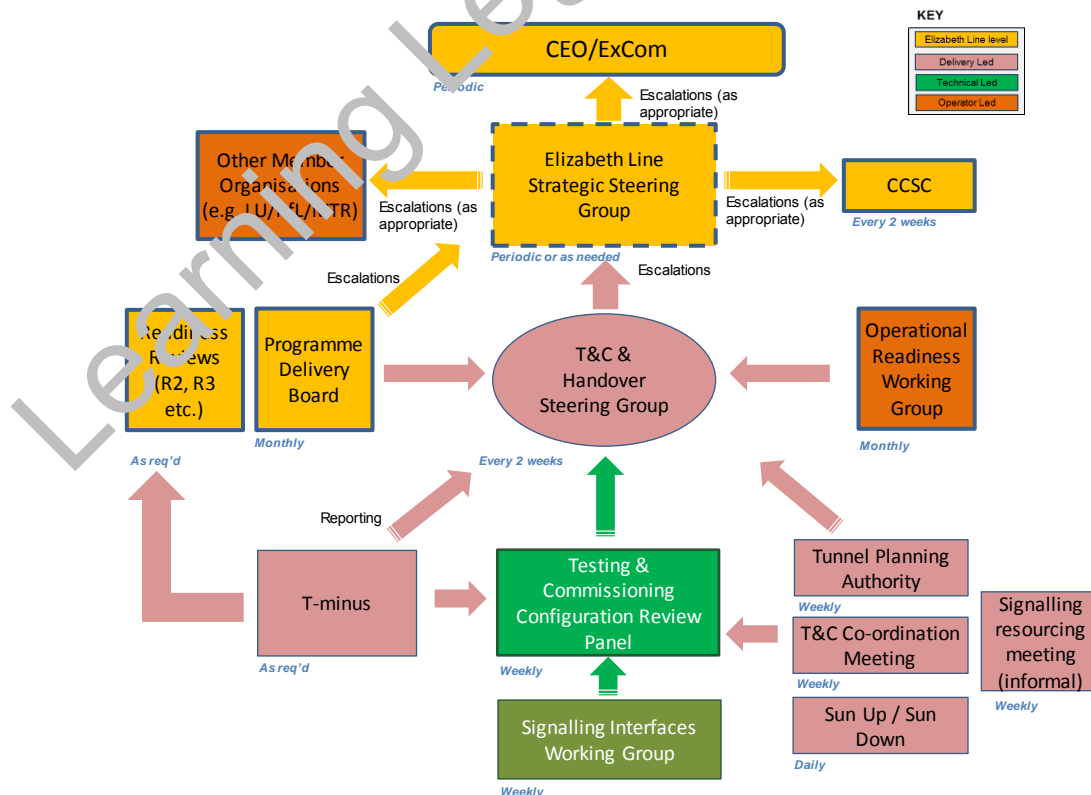
Figure 5 – Testing and Commissioning Governance Model
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8.2 Programme Delivery Board

8.2.1 Purpose

The Programme Delivery Board (PDB) is the main review body for delivery of a safe operational end-to-end railway that meets the Sponsors' Requirements, in accordance with the Project Development Agreement (PDA). It is designed to assure the delivery and integration of the railway - across all railway systems, rolling stock, depots, Central Section and NR surface works infrastructure, combined with operations and maintenance requirements, and all Operator interfaces – is successfully achieved ahead of the remaining four commissioning stages.

8.2.2 Objectives

The PDB's objectives focus on collaboration and integration, on making sure that all the necessary components of the railway are aligned and that accountability is clearly understood and that ALL critical issues are managed effectively in order to complete the works on time, safely and within the funding available.

These objectives can be listed as follows:

- Review, interrogate and critique delivery performance across all key projects within the CRL programme
- Assure contracts and agreements are delivered in a manner consistent with CRL's financial constraints, commercial objectives, legal obligations, strategies, policies and procedures
- Exercise review over all matters relating to performance, cost, schedule, quality, risk, change and management of contingency
- Facilitate effective relationships to enable CRL, LU and RfL to pursue successful delivery of the Crossrail Project in accordance with the CRL – LU Development Agreement (LUDA), the provisions and requirements of the Protective Provisions Agreement (PPA), the CRL – RfL Memorandum of Understanding (MoU) and the PDA, and in support of their wider duties and obligations
- To manage the key integration risks and issues, complex interfaces (especially interfaces at the boundaries with NR), and outwith the central section
- To ensure operations and maintenance requirements are met, and to deal with issues that arise between Operations concepts/rules and design
- To increase understanding of railway integration by working back from the Handover process to understand the impact of current activities upon overall integration

8.2.3 Chair

Chair (Stage 2, 4 & 5)	Operations Director ▓▓▓▓▓▓
Chair (Stage 3)	Programme Director ▓▓▓▓▓
Deputy Chair	Finance Director ▓▓▓▓▓

8.2.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Programme Director	▓▓▓▓▓▓
Crossrail	Operations Director	▓▓▓▓▓▓
Crossrail	Finance Director	▓▓▓▓▓▓▓
Crossrail	Delivery Director	▓▓▓▓
Crossrail	Programme Controls Director	▓▓▓▓▓▓▓▓
Crossrail	Technical Director	▓▓▓▓▓

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Crossrail	Chief Engineer	███████
Crossrail	Head of Integration	█████████
Crossrail	Head of Planning	██████

By Invitation - such other Directors and/or senior managers as the PDB considers appropriate		
Organisation	*Title*	*Name*
• Network Rail • MTR • LU • RfL • PRep	Directors and Senior Managers	As requested

8.2.5   Secretariat

Programme Controls Director ███████████████ or his designate, responsible for:

- Organising the meetings
- Production of metrics and reports as required
- Maintenance of the PDB Issues Log
- The generation and maintenance of PDB procedures and processes

8.2.6   Quorum

The meeting is quorate with five members present.

8.2.7   Frequency

Meetings will be held over 2 days, every **four weeks** during week 2. However, as we near the commencement of Stage 2 Phase 1, Stage 2 Phase 2 and Stage 3, it is fully anticipated that formal PDB sessions will increase in frequency.

8.2.8   Inputs

The PDB will receive periodic performance summaries from all Delivery projects, as well as the Technical, Operations and Surface Directorates and Infrastructure Maintainers; with input from RfL/NR/LU/MTRC as the future Infrastructure Managers and HAL as a current Infrastructure Manager, typically in the form of dashboards, in order to ascertain the implementation status of each part of the programme.

These will be submitted at least two working days prior to the PDB. The performance summaries will allow the following PDB critical questions to be considered for each area of the programme during a typical meeting:

- Are we safe?
- Are we on time?
- Are we within funding?
- Are we delivering quality in accordance with the requirements?
- Are we managing the project effectively?
- Do we understand all the integration issues and are we addressing all the challenges?
- Are all accountabilities clearly understood and assigned?

8.2.9   Agenda

Across a typical 2 day meeting, the agenda will be as follows:

- Review of Stage 2 (Operational Readiness, NR On Network Works, Heathrow spur, Rolling Stock, Depot, MTR, Agreements and Regulatory Approvals)
- Review of Stage 4&5 (Operational Readiness, NR On Network Works, Rolling Stock, Plumstead Sidings, MTR, and On Network Surface improvement programme)
- Review of Stage 3 (Testing & Commissioning, Operational Readiness, Interfaces, Regulatory Approvals, Handover and Bringing into Use, Technical and Integration issues)

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- Review of Stations and Systemwide

The PDB will act; as the context requires, to advise, assist, make recommendations and report to the Executive and Investment Committee via the periodic Board Report in order to facilitate its and the Board's understanding, review and monitoring of:

- CRL's performance;
- CRL's delivery strategy;
- CRL's handover strategy;
- CRL's readiness for delivery of Stage 2, 3, 4 & 5

8.2.10 Outputs

- The Secretariat of the PDB shall record actions coming out of the PDB Review and circulate these to all parties. It will be the responsibility of each part of the programme, including the CRL directorates and Infrastructure Managers, to deliver their actions in an integrated manner that furthers successful delivery of the Stages
- Actions shall be considered as either Critical Actions or Non-Critical. If the former, then these shall be transferred to the Critical Issues Action Tracker process and managed accordingly
- Where the PDB advises on, assists, makes recommendations, decides and/or reports on a matter with significant financial consequences to the Executive and Investment Committee or Board, a note shall be recorded at the Commercial and Change Sub-Committee

8.2.11 Governance and Authority

- The PDB has no authority in the Scheme of Authorities, except where the Programme Director and/or Operations Director wish to exercise their appointed Delegated Authority
- The PDB may establish working groups as it sees fit to consider and address specific issues on its behalf, but may not delegate its authority to such groups. It will establish and define terms of reference for CRL/LU/RfL Working Groups, as set out in Clause 15 of the LUDA, and as required to support the CRL-RfL MoU
- The PDB shall keep its Terms of Reference under review and make recommendations to the Executive and Investment Committee if and when changes are needed
- The PDB will identify and agree opportunities for increased value to CRL, LU and RfL, such as shared possessions, amalgamation of contractor's work scopes, integration of programmes and risk management
- The PDB will monitor progress in respect of all engineering, contractual, programming and commercial interfaces between LU, RfL and CRL
- The PDB will monitor and progress any issues requiring resolution under Clause 31 (Issue Resolution) of the LUDA, and Section 15 of the CRL – RfL MoU, and any differences pertaining to the CRL – RfL interface schedule (in accordance with Section 16 of the CRL – RfL MoU) and the Integrated Works Programme/LU interface scope schedule (in accordance with Clause 5 and Clause 7 of the LUDA)

9 Delivery Directorate - Terms of Reference

9.1 Stations Steering Group

9.1.1 Purpose

The purpose of the Stations Steering Group is to provide focus and support for the overall governance, direction and delivery of the Central Section Stations Programme

9.1.2 Objectives

The Stations Steering Group (SSG) is designed to support the station project teams as a collaborative, open forum that can discuss key principles, synergies and opportunities in order to positively influence stations delivery. The Stations Steering Group will:

(i)   Convey strategic direction and intent to all Stations

(ii) Sponsor 'contractor-collaboration', and drive the pace of the Stations programme

(iii) Ensure alignment on station priorities & initiatives; consider and promote areas of opportunity, to improve execution performance through synergies

(iv) Review the status and on-going effectiveness of Stations direction, making course corrections as required

(v)   Steer the interaction and (access) opportunities for system-wide works

9.1.3 Chair

Chair: Stations Delivery Director ███████████

Deputy Chair: As Appointed by - Stations Delivery Director

9.1.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail (CRL)	Stations Delivery Director	████████
Crossrail	Crossrail Construction Manager	████████
Crossrail	Stations Planner	████████
Crossrail	Head of Planning	██████
Crossrail	Common Procurement PM	████████
Crossrail	Chief Engineer	██████
Crossrail	Technical Director	████████
Crossrail	Project Manager C610/C644	███████
Tier 1 Contractors	Balfour Beatty, Laing O'Rourke, BFK, BBMV, CSJV, and Costain	████
RfLI	Head of Engineering	████████
LU	Head of LU Crossrail Team	██████
Project Representative	P-Rep	██████
By Invitation - other members of Crossrail and Tier 1 Contractors are invited to attend as appropriate		

9.1.5 Secretariat

The Secretariat for the meeting will be determined by the Stations Delivery Director.

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9.1.6 Quorum

The Stations Steering Group has no defined quorate – it is an opportunity to air critical issues pertaining to stations, and endorse (for subsequent formal approval) stations-wide changes by strategic consensus with all stakeholders.

9.1.7 Frequency

Meetings will be held every eight weeks for a period of two hours.

9.1.8 Inputs

- Updates from the Stations, Shafts and Portals delivery programme plan
- Escalations from Contractors, Project Managers/Sector Directors, Delivery Directors or Technical that relate to common stations wide issues

9.1.9 Agenda

Agenda items will be determined and notified prior to each meeting. A typical agenda may include:

- Status of Stations programme
- Common procurement/design/construction or quality challenges
- Update on implementation of Stations instructions

9.1.10 Outputs

- Agreed and endorsed Stations-specific or Stations-wide actions to take

9.1.11 Governance and Authority

- Authority for decision making is at the Programme Director level.
- The SSG affirms the planning and execution strategy for successful delivery of the stations, portals & shafts programme
- The SSG is not:
  - An opportunity to air every issue and problem pertaining to stations
  - A forum to negotiate or articulate commercial/contractual positions
  - Formally empowered to approve change

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9.2 Critical Issues

9.2.1 Purpose

The purpose of the Critical Issues meeting is to support the delivery of the critical path of the Programme by the prompt escalation, action and resolution of critical issues requiring wider Programme support.

9.2.2 Objectives

The Critical Issues meeting is a weekly escalation forum that aims to:

(i) Promptly resolve level 1 critical issues

(ii) Assure that level 2 critical issues are being adequately managed

9.2.3 Chair

Chair: Delivery Director ██████████ or Delivery Directors ██████████████████████

9.2.4 Membership

There is no standing membership to critical issues. Attendance is dictated by the issues within the list

9.2.5 Secretariat

██████████ (Cost Manager) or designee

9.2.6 Quorum

The Critical Issues meeting has no required quorate to meet other than the presence of a Delivery Director as Chair, and the presence of those required to agree to its action.

9.2.7 Frequency

Meetings will be held **every week** on Monday mornings for a period of 1 hour.

9.2.8 Inputs

Critical Issues tracker (from previous Friday)

9.2.9 Agenda

The critical issues tracker informs the agenda for each meeting and will focus on a full review of the Level 1 critical issues in each of the following areas, and level 2 critical issues by exception:

- Stations, Shafts and Portals Zones 1 and 2, and Zones 3 and 4
- Systemwide
- Technical

9.2.10 Outputs

Updated Critical Issues tracker (issued for update by the following Friday, and finalised and issued for review prior to the next Critical Issues meeting the following Monday)

9.2.11 Governance and Authority

- The Critical Issues meeting meets with the authority of the Delivery Director
- The meeting is facilitated by the Deputy Delivery Directors for each sector who take responsibility for the escalation of critical issues required to support their sector programmes
- Critical Issues will be categorised as either Level 1 (requiring wider cross-sector or programme support) or Level 2 (urgent but being managed within a sector or directorate)
- Each critical issue will have an issue owner, clear description, sector reference, contract reference, action owner, action plan, date required and an estimated completion date
- All Critical Issues will be reviewed and updated weekly for as long as they remain on the critical issue register, and removed from it if no longer deemed critical

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9.3 Master Operational Handover Schedule (MOHS) Review

9.3.1 Purpose

The purpose of the MOHS review is to review the impact of the periodic updates upon the overall Programme forecast, including the critical path, and identify any actions required to maintain it

9.3.2 Objectives

The objectives of the MOHS review are to enable proactive management and control of the programme, and to provide assurance to internal and external stakeholders:

(i)   Ensure that the individual project schedules collectively meet the requirements of the programme, and that all parties are working and committed to a programme-wide schedule

(ii)   Maintain integrity and timeliness of the Master Operational Handover Schedule (MOHS) through regularly monitoring schedule data quality, accuracy and completeness

(iii)   Ensure the MOHS has sufficient information related to design, procurement, construction, manufacture, installation, systems integration, testing and commissioning and handover activities including all necessary approvals, consents, access requirements and railway possessions

(iv)   Check and review the MOHS to observe the impact of the periodic updates on the overall Programme forecast, including analysis of the critical path

9.3.3 Chair

Chair: Programme Director ██████████████

Deputy Chair: Technical Director ████████████

9.3.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Programme Director	████████████
Crossrail	Technical Director	████████████
Crossrail	Surface Director	████████████
Crossrail	Delivery Director	████████
Crossrail	Stations Delivery Director	████████████
Crossrail	Rail Systems Delivery Director	████████████
Crossrail	Testing and Commissioning Programme Director	██████████
Crossrail	Testing and Commissioning Manager	████████
Crossrail	Planning Engineer	████████
Crossrail	Head of Integration	██████████
Crossrail	Integration Planning Manager	██████████
Crossrail	Head of Planning	███████
Crossrail	Commercial Director	██████████
Crossrail	Chief Engineer	█████████
P-Rep	Project Representative	██████████
By Invitation - other members of the Crossrail project teams are invited to attend as required		

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9.3.5 Secretariat

█████ (Head of Planning) or designee.

9.3.6 Quorum

A minimum of four must be present including the Programme Director or Technical Director, Delivery Director, Planning representative and P-Rep for the MOHS review to be quorate.

9.3.7 Frequency

Meetings will be held **every four weeks** on Thursday/Friday of Week 1 following the lock-down of the periodic update of the MOHS schedules

9.3.8 Inputs

- Locked-down MOHS for the period
- Project schedules (level 2)
- Tier 1 Contractor schedules (level 3)

9.3.9 Agenda

The Agenda for the MOHS review is led by the Programme Director, in conjunction with the Head of Planning and Delivery Director to:

1. Review accuracy and completeness
2. Review progress against the MOHS plan within the period
3. Confirm any movement in the overall programme forecast, and critical path analysis (including Earned Value Analysis, or trending)

9.3.10 Outputs

Outputs will be taken away as actions by the attendees at the MOHS review. These could include:

- Questions to be posed to Project Managers at the next Programme Delivery Board
- Change papers to be drafted
- Critical issues to be actioned immediately
- Scenario analysis to be undertaken, including the modelling and analysis of schedule risk and the effects of change to major elements of Crossrail

9.3.11 Governance and Authority

- The MOHS Review meets with the authority of the Programme Director
- A periodic update of the (MOHS) is required to take account of the circumstances at that time and so as to enable the Sponsors to monitor the overall progress of the Crossrail Project, as stipulated under the Project Development Agreement (PDA)
- The MOHS Review has no change authority, except where the Directors choose to exercise their own delegated authority
- All Anchor Milestones and Key Event milestones within the MOHS provide a representative view of the programme's significant and important dates, and as such are subject to change control

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9.4 Testing, Commissioning and Handover Steering Group (TCHSG)

9.4.1 Purpose

The purpose of the Testing, Commissioning and Handover Steering Group (TCHSG) is to provide guidance and direction to the prioritisation and coordination of testing, commissioning and handover activity of CRL's railway systems, rolling stock, stations, shafts and portals contractors, the Technical team, and the Operators.

9.4.2 Objectives

The objectives for the TCHSG are to:

- Provide drive and leadership for the achievement of Testing, Commissioning and Handover milestones in support of energisation, dynamic testing, trial running;
- Receive progress reports from Contractors, Operators, Testing & Commissioning Configuration Review Panel (TCCRP), the Stage 3 Elizabeth Line Readiness Steering Group, and the Handover Delivery Working Group and review for impacts upon the critical path
- Resolve the key issues facing Testing, Commissioning & Handover that threaten the critical path through interfacing with CRL's supply chain and the Operators and prioritising
- Provide reporting on the testing and commissioning programme and escalate issues as required to the Programme Delivery Board (PDB) and Elizabeth Line Strategic Steering Group.

9.4.3 Chair

Chair: Delivery Director ▉▉▉▉▉▉

9.4.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Central Section Delivery Director	▉▉▉▉
Crossrail	Testing and Commissioning Programme Director	▉▉▉▉
Crossrail	Testing and Commissioning Manager	▉▉▉▉
Crossrail	Stations Delivery Director	▉▉▉▉
Crossrail	Rail Systems Delivery Director	▉▉▉▉
Crossrail	Chief Engineer	▉▉▉▉
Crossrail	Surface Director	▉▉▉▉
Crossrail	Head of Integration	▉▉▉▉
Crossrail	Crossrail Construction Manager	▉▉▉▉
RfL	Head of Engineering Crossrail Infrastructure	▉▉▉▉
RfL	Rolling Stock – Project Manager	▉▉▉▉
RfL	Deputy Director of Operations	▉▉▉▉
LU	Head of Engineering LUCT	▉▉▉▉
LU	Head of LUCT	▉▉▉▉
NR	Programme Manager	▉▉▉▉
MTR	Programme Director	▉▉▉▉
By Invitation - other members of the Crossrail project teams are invited to attend as required		

9.4.5 Secretariat

▉▉▉▉ or designee is responsible for the administration of the TCHSG process including:

- Organising the meetings and agendas
- Maintenance of the Minutes and Action Tracker

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- Accumulating the relevant inputs for each meeting; including dashboards

9.4.6 Quorum

The meeting shall be quorate with the presence of, or designees for, the Central Section Delivery Director, Rail Systems Delivery Director, Stations Director, Chief Engineer, Surface Director and/or a NR representative (where issues covering the NR east/west interfaces are discussed)

9.4.7 Frequency

Meetings will be held every **two** weeks for a period of 1 ½ hours, or more frequently if required. The Chair will maintain a calendar of agreed meeting dates

9.4.8 Inputs

- Summary reports from the T-minus reviews, the Testing & Commissioning Configuration Review Panel (TCCRP), Handover Strategy Group, Handover Delivery Working Group, and the Stage 3 Elizabeth Line Readiness Steering Group
- A review of T&C dashboards, including the relevant metrics, with a progress review of T&C at each Element
- Handover dashboard
- Testing and Commissioning Action Tracker

9.4.9 Agenda

The agenda and any relevant papers shall be issued to named attendees and other invitees at least two working days in advance of a meeting. A typical agenda may include:

- Review of reports from the T-minus reviews, the TCCRP, and the Stage 3 Elizabeth Line Readiness Steering Group and the overall testing, commissioning and handover programme
- Review of Key Actions (from the Testing, Commissioning and Handover Tracker)
- Review of Handover key issues (from the Handover Delivery Working Group or Handover Strategy Group)
- Review of any decisions needed to maintain the testing, commissioning and handover critical path, including any instructions or reprioritisations needed to contractors/delivery partners/operators and an assessment of their cost, schedule and safety impact
- Forecast of future topics

9.4.10 Outputs

Outputs will be taken away as actions by the attendees. An action tracker will be maintained by the Secretariat. Following each meeting there will be:

- Updates made to the Testing, Commissioning and Handover Action Tracker
- Records taken on any issues that might affect either the interim or permanent safety case and require a submission/re-submission to RAB(C) for approval, prior to making a decision
- Escalation of any key issues, as required, to the Elizabeth Line Strategic Steering Group or the Programme Delivery Board (PDB)

9.4.11 Governance and Authority

- The Testing, Commissioning and Handover Steering Group will report to the Programme Delivery Board, and the Elizabeth Line Strategic Steering Group, which are both chaired by the Programme and/or Operations Director
- The Testing, Commissioning and Handover Steering Group will usually consider changes to the Testing and Commissioning programme critical path that have a schedule impact of >2 weeks, and/or that require adjustments to operational or maintenance plans, and/or cost impacts up to £250k, or otherwise any significant configuration changes

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9.5 T-minus Readiness Review

9.5.1 Purpose

The purpose of the T-minus readiness review is to review the state of readiness of CRL's railway systems, rolling stock, stations, shafts and portals contractors, the Technical team, and Operators that support the key programme milestones of traction power energisation, dynamic testing, transition testing, and trial running to an agreed T-minus schedule in order to assure each will be met.

9.5.2 Objectives

The objective for the T-minus readiness review is to run a metric-based countdown review of each of the key activities/deliverables outlined in the suite of colour-coded Testing and Commissioning papers for the following key programme milestones:

- Traction Energisation (Zones 1 & 2)
- Dynamic Testing (Zones 1 & 2)
- Transition Testing (GEML) @ PML
- Traction Energisation (Zones 1 to 4)
- Dynamic Testing (Zones 1 to 4)
- Transition Testing (GWML) @ WBP
- Trial Running

9.5.3 Chair

Chair: Rail Systems Delivery Director (Colin Gainsford)

9.5.4 Membership

Membership – will vary according to the T-minus review being undertaken, but will typically include:		
Organisation	**Title**	**Name**
Crossrail	Rail Systems Delivery Director	███████████
Crossrail	Testing and Commissioning Programme Director	██████
Crossrail	Testing and Commissioning Manager	██████
Crossrail	Test Track & Rolling Stock interfaces engineer	█████████
Crossrail	Chief Engineer	█████
Crossrail	Operations Deputy Director	████
Crossrail	Rolling Stock PM	██████
Crossrail	Manager of Engineering – Railway Systems	███████
RfLI	Head of Infrastructure	█████
RfLI	T&C Coordinator	███████
Crossrail	Surface Director	███████
Crossrail	Delivery Construction Manager	██████
Crossrail	Commissioning & Handover Planning Lead	████
Crossrail	H&S Manager - Systemwide	█████
RfL	Head of Engineering Crossrail Infrastructure	██████
LU	Head of Engineering (LUCT)	████
NR	Programme Manager SE/NE	██████████
MTR[C]	MTR-C Stage 3 Delivery Manager	████████
Siemens	Testing and Commissioning Manager	███████
ATC	Testing and Commissioning Manager	█████
By Invitation - PMs attend by exception / surgery based time table as required		

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9.5.5 Secretariat

███████ or designee is responsible for the administration of the T-minus process.

9.5.6 Quorum

The meeting shall be quorate with the presence of, or designees for, Systemwide Delivery Director, Testing and Commissioning Programme Director and/or a NR representative (where issues covering the NR east/west interfaces are discussed).

9.5.7 Frequency

Meetings will be held every **week** for a period of 1 hour, or more frequently if required. The Chair will maintain a calendar of agreed meeting dates via the secretariat.

9.5.8 Inputs

Inputs will derive from the relevant T&C and project dashboards and metrics, including but not limited to:
- Assurance and documentation status trackers
- Existing project readiness/contractor trackers
- IRNs and certification trackers
- Other project level T&C action trackers

9.5.9 Agenda

The agenda shall be informed by the agreed T Minus schedule, and the activities on the readiness tracker that align to the programme milestone being reviewed that need to be assured at that time in order to meet it. This may include reviewing the RAG status of qualitative activity, and reviewing quantitative progress via key productivity metrics, where available.

9.5.10 Outputs

Outputs will be taken away as actions by the attendees, and the readiness tracker will be updated accordingly. Following each meeting there will be:

- Updates made to the Testing & Commissioning readiness tracker.
- A report given to the next Testing, Commissioning and Handover Steering Group

Records will also be taken on any issues that might affect either the interim or permanent safety case and require a submission/re-submission to RAB(C) for approval.

9.5.11 Governance and Authority

- Governance for the T-minus readiness review will derive from the suite of T&C coloured papers; energisation (orange), dynamic testing (blue), HV Non-Traction (red), transition testing (green) and trial running (grey). It will also be informed by the Readiness Gate procedure.
- The T-minus readiness reviews shall report into the fortnightly Testing, Commissioning and Handover Steering Group, chaired by the Delivery Director.
- They will also assess readiness for the main programme-level go/no go readiness gates for Energisation (R2.1 and R2.2), Dynamic Testing (R3.1 and R3.2) and Trial Running (IM1) that will be chaired by the Programme Director.
- Any other key issues will be escalated to the Elizabeth Line Strategic Steering Group or the Programme Delivery Board (PDB) as required

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9.6 Safety & Health Leadership Team (SHELT)

9.6.1 Purpose

The purpose of the Crossrail Safety & Health Leadership Team (SHELT) is to provide the collective leadership that positively influences the Health & Safety culture and behaviour across the Crossrail Project, to achieve a culture within the entire workforce that has a collective belief that all accidents and injuries are preventable, and thus achieve "Target Zero".

9.6.2 Objectives

The Vision for SHELT - and therefore of each member - is to ensure world class health and safety performance for Crossrail and set the standard for the wider construction industry.

The Mission for SHELT is to drive the delivery of this world class health and safety performance through empowering those engaged on Crossrail and creating a sense of pride in what is being achieved.

The SHELT shall:

- Collectively develop and review the health & safety strategy for the Programme and ensure implementation by providing direction and motivation to each contract
- Identify improvements and agree campaigns and initiatives in support of the strategy
- Recognise best practice and share openly for others benefit
- Work collaboratively and use the influence of the team to raise the standards to the highest level for the contracting community, the Programme and, as a consequence, set new standards for the construction industry as a whole
- Conduct Leadership Tours at other contract locations and welcome the same as part of the sharing agenda

9.6.3 Chair

Chair: Health and Safety Director ▉▉▉▉▉

9.6.4 Membership

SHELT shall be formulated from the Principal Contractors (PC's) and selected Crossrail representatives on the project with the aim of achieving the proposed objectives through the collective positive influence of senior management representing each Contractor.

9.6.5 Secretariat

Secretariat duties will be provided by the Health and Safety Director.

9.6.6 Quorum

Meetings will require the presence of the PC's Managing Director (MD) for each contractor or joint venture delivering Crossrail. In the event that the nominated MD is unavailable a senior management representative from the organisation may deputise, provided this is identified in advance.

9.6.7 Frequency

Meetings will be held every **four** weeks. They will be held alternately onsite [where the SHELT shall precede the Crossrail Industry Group (CIG)] and in the Crossrail offices in Canada Square. The Chair will maintain a calendar of agreed dates.

9.6.8 Inputs

In advance of meetings an agenda and record of agreements/actions of the previous meeting shall be sent to members no less than 3 working days before the meeting. Items and reports may be tabled with the agreement of the Chair.

9.6.9   Agenda

Each SHELT meeting will be led in the spirit of its vision and values and in the furtherance of its overarching objective to deliver Target Zero. All SHELT members are committed to creating a step change and have undertaken to bring the vision and mission to life for their respective teams by:

- Leading by example
- Trusting and supporting each other
- Sharing thoughts and experiences
- Being open to challenge and holding each other to account
- Investing time
- Learning from what we do and continually raising the bar
- Celebrating success
- Fully engaging with our workforce and stakeholders
- Working with pride, pace and passion
- Delivering on promises

All relevant issues will be included on the meeting agenda and SHELT members will receive timely, relevant information to enable them to be effective participants.

9.6.10   Outputs

- Agreed actions from the SHELT shall be circulated to members no more than 5 working days after each meeting.
- The Chair shall consult with individual members outside of the SHELT meeting as may be necessary to facilitate the rapid resolution of any issues.
- The SHELT shall report, as required, to the CIG and the CEO Forum.
- Outcomes from the SHELT shall be shared within each of the represented members' own organisations where required.

9.6.11   Governance and Authority

- Meeting frequency and membership will be reviewed every six months.
- Any amendments to the Terms of Reference of the SHELT will be agreed by its members.
- Where necessary, the SHELT will promote the setting up of sub groups to deal with specific issues, campaigns and initiatives and monitor the performance of these groups to ensure the required outcomes are being delivered in an efficient and timely fashion.
- The Chair will consult with the wider CIG, CEO forum and CRL executives to promote the activities of SHELT and to facilitate proactive management of any challenges and further strategic alignment.
- The SHELT shall not:
  - Remove the responsibility of the individual project or contract to identify and manage risk and deliver against the requirements of the works information.
  - Prevent an individual contract operating autonomously in managing risk but may encourage the sharing of an approach with the wider community where it deems necessary.

9.7 Handover Delivery Working Group

9.7.1 Purpose

The purpose of the Handover Delivery Working Group (HDWG) is to periodically review progress of the overall Handover programme and on each Element, and any issues that need to be resolved through the Handover Strategy Group, or escalated to the Testing & Commissioning and Handover Steering Group.

9.7.2 Objectives

The objectives for the HDWG are to:

- Review the overall status of the Handover programme via the Handover dashboard
- Review the status of each Element against the 9 requirements for Handover
- Review the progress of closure of all FDO issues and IAs for each Element
- Identify any additional resources or support needed to maintain the Handover programme
- Identify and agree the resolution route for all other issues

9.7.3 Chair

Chair: Handover Manager (Patrick Barry)

9.7.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Handover Manager (CRL)	██████████
Crossrail	Crossrail Construction Manager	██████████
Crossrail	Handover Manager (Railway Systems)	████████
Crossrail	Commissioning & Handover Planning Lead	██████
Crossrail	Agreements Manager	██████████
Crossrail	Training Manager	██████████
Crossrail	Data and Asset Transfer Manager	██████████
Crossrail	Programme Integration Manager	██████████
By Invitation - other individuals will be invited as deemed necessary, either as a group member or for specific agenda items.		

9.7.5 Secretariat

Secretariat duties will be provided by the Handover Manager.

9.7.6 Quorum

There is no deemed quorate for the HDWG. However, the presence of a chair or a designee will be necessary as a minimum to convene a meeting.

9.7.7 Frequency

Meetings will be held every **four** weeks. The Chair will maintain a calendar of agreed dates.

9.7.8 Inputs

The scope of the Handover Delivery Working Group will cover the 28 x Elements where the Handover is from CRL to RfL or LU as identified within the Handover Strategy and Plan. Inputs will include:

- The Handover dashboard, including KPIs and performance measures
- Handover progress for each Element against the nine requirements
- FDO issue closure progress and Interim Acceptance
- Lessons learned for sharing

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9.7.9   Agenda

A typical agenda for the Handover Delivery Working Group may include a review of:

1. The overall status of the Handover programme, and a look ahead
2. The status of each Element (by exception) against the 9 requirements for Handover
3. The progress of closure of all FDO issues and IAs for each Element
4. Any additional resources or support needed to maintain the Handover programme
5. Any other issues requiring resolution
6. Outstanding actions from previous meetings
7. Lessons learned to be shared or cascaded, or;
8. Any new or revised procedures or templates to be communicated out

9.7.10 Outputs

- Any agreed actions will be issued within 3 working days
- Updated periodic Handover report, with a summary status update for those requesting it.
- Decision on issues to escalate to the Testing, Commissioning and Handover Steering Group, Programme Delivery Board or delegate to the Handover Strategy Group to work to resolution.

9.7.11   Governance and Authority

- The Handover Delivery Working Group will report to the Testing, Commissioning and Handover Steering Group and Programme Delivery Board as a standing agenda item.
- The Handover Strategy Group will work in tandem with the Handover Delivery Working Group to resolve issues that require further detailed investigation between Crossrail and the Operators

9.8 Construction Interfaces Working Group

9.8.1 Purpose

The purpose of the Construction Interfaces Working Group (CIWG) is to develop, agree and communicate the procedures, guidelines, templates etc. that facilitate the logistical and operational interfaces between different Tier 1 contracts across Crossrail.

9.8.2 Objectives

The objectives for CIWG are to

- Develop and agree: procedures, deliverables, detailed roles and responsibilities for key logistical and operational interfaces within the construction projects;
- Where possible, create standardised solutions and approaches for key logistical and operational elements to facilitate delivery of scope within sites manged by different Principal Contractors.
- Report progress and escalate issues to SHELT; and
- Form any specific working groups required to deliver the above.

9.8.3 Chair

Chair: Crossrail Construction Manager (Andy Weber)

9.8.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Crossrail Construction Manager	▓▓▓▓▓▓
Crossrail	Health & Safety Director	▓▓▓▓▓▓
Crossrail	Systemwide Field Engineering Manager	▓▓▓▓▓▓
Crossrail	Stations and Systemwide Safety Manager	▓▓▓▓▓
SHELT	Nominated Representative	▓▓▓▓▓ (LOR)
Tier 1 Contractors	C350, C360, C405, C412, C422, C435, C502,	Nominated Representative(s)
Tier 1 Contractors	C512, C520,C530, C610, C620, C631, C650,	Nominated Representative(s)
Tier 1 Contractors	C660	Nominated Representative(s)
By Invitation		
Organisation	**Title**	**Name**
	As applicable to the agenda	
By Invitation - other individuals will be invited as deemed necessary, either as a group member or for specific agenda items.		

9.8.5 Secretariat

Secretariat duties will be provided by CRL, the secretary will be appointed by the Chair.

9.8.6 Quorum

There is no defined quorate for the CIWG. However, the presence of the Chair will be necessary as a minimum to convene a meeting.

9.8.7 Frequency

Meetings will be held every **four** weeks, or more frequently if required. The Chair will establish a calendar of agreed meeting dates but meetings will be cancelled if there are no agenda items.

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9.8.8   Inputs

CIWG agenda will be self generated by the group or respond to instruction from SHELT to address an issue and report back.

9.8.9   Agenda

The agenda and any relevant papers shall be issued to named attendees and other invitees in advance of a meeting. The agenda will be uniquely generated in advance of each meeting dependant upon the required discussions.

9.8.10 Outputs

- The output will generally be issued through a CEC containing the relevant information agreed for instruction to each Tier 1 via their project teams.
- When required, the content of the CEC will be presented to SHELT in advance of issue to obtain their endorsement.
- Presentation material is made available where relevant and upon request of the attendees.

9.8.11 Governance and Authority

- The Construction Interfaces Working Group reports to SHELT and receives issues for resolution from that group as well as those self-generated by CIWG representatives as issues arise that need, or would benefit from, a common solution.
- The Chair sits on SHELT. SHELT provide a representative to each CIWG meeting to ensure a reliable link between the two groups.

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9.9 Signalling Interfaces Working Group

9.9.1 Purpose

The purpose of the Signalling Interfaces Working Group (SIWG) is to provide in-depth oversight and support for all technical interfaces needed to commission the Stage 3 signalling system within Crossrail's Central Operating Section and fringes with Network Rail, including providing a forum for the analysis and disposition of technical issues that arise during software development and testing.

9.9.2 Objectives

The objectives of the SIWG are to:

- Ensure the programme integration of software releases, testing (within the Central Operating Section, at Melton and on various test rigs) and safety case and assurance approvals that are required to fully commission the Stage 3 signalling system.
- Agree the final signalling systems configuration that will be used for Stage 3 opening of the Central Operating Section.
- Recommend to the TCCRP, TCHSG and ELSSG any decisions regarding Stage 2 software development/testing and Stage 3 commissioning that may be required to protect the Stage 3 commissioning.
- Address and ensure resolution of the specific technical issues which have arisen to date (reference 27th March 2018 presentation from Bombardier).
- Address and ensure resolution of future technical issues which arise during software development and testing.

9.9.3 Chair

Chair: Chief Engineer ███████

9.9.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Chief Engineer	███████
Crossrail	Signalling and Communications Delivery Director	███████
Crossrail	Testing and Commissioning Manager	███████
Crossrail	Head of Signalling	███████
RfL	Rolling Stock Project Manager	███████
Siemens	Siemens - Signalling Project Director	███████
Bombardier	Technical Representative	███████
Crossrail	Head of Integration	███████
By Invitation - other individuals will be invited as deemed necessary for specific agenda items.		

9.9.5 Secretariat

███████ or designee is responsible for the administration of the SIWG, including organising the meetings and agendas, maintenance of the minutes and action trackers, and accumulating the relevant inputs for each meeting.

9.9.6 Quorum

The meeting shall be quorate with the presence of, or designees for, the Chief Engineer, the Signalling and Communications Delivery Director, the Crossrail Testing and Commissioning Manager and one authorised representative each from RfL, Siemens and Bombardier.

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9.9.7 Frequency

Meetings will be held **every week** for the period of time identified by the Chair. The Chair will maintain a calendar of agreed meeting dates.

9.9.8 Inputs

- Integrated programme for software development and dynamic testing
- Outputs and test logs that arise during software development and testing

9.9.9 Agenda

An agenda and any relevant documentation will be issued to all members and other invitees in advance of each meeting.

9.9.10 Outputs

- Decisions and any associated instruction of activities required to resolve issues which have arisen during software development and testing.
- Recommendations for the prioritisation of activities between Siemens, Bombardier, RfL and CRL that are needed to support the successful Stage 3 signalling system commissioning.

9.9.11 Governance and Authority

- The SIWG will report to both the TCCRP (for technical matters and decisions), inform the TCHSG (for decisions that may affect prioritisations within the T&C programme) and the ELSSG (for strategic and financial matters and decisions).

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10 Surface Directorate - Terms of Reference

10.1 Network Rail Programme Delivery Board

10.1.1 Purpose

The purpose of the NR Programme Delivery Board is to monitor, report and review progress of the On Network Works programme.

10.1.2 Objectives

The objectives of the NR Programme Delivery Board are to:

(i) Agree working level arrangements for meetings reporting to the NR PDB

(ii) Provide senior level guidance and support for the overall delivery of the On Network Works

(iii) Review, and if required resolve, disputes

(iv) Address emerging issues which have or could reasonably be expected to have a material impact on the Crossrail Project

(v) Receive and review the NR Programme period progress report (including other aspects such as Railway systems monitoring and engineering systems integrations services)

(vi) Review overall progress of the On Network Works, including development, delivery, key risks and stakeholder engagement issues

(vii) Consider and make appropriate recommendations on proposed variations or any matters that require CRL Consent

(viii) Review the costs to be logged to the RAB through NR's regulatory accounts

(ix) Recommend reports and refer issues to the Crossrail Programme Delivery Board, and CRL Board as required

(x) Recommend the Overall Target Price for the Sponsors

10.1.3 Chair

Chair: Surface Director █████████

Deputy Chair: NR Crossrail Delivery Director █████████

10.1.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Surface Director	████████
Network Rail	NR Crossrail Delivery Director	████████
Crossrail	Surface – Commercial Manager	████████
Network Rail	Senior Sponsor	██████████
Network Rail	Crossrail Programme Commercial Manager	████████████
ORR	Senior Enhancements Manager	█████████
P-Rep	Project Representative	████████
By Invitation - other members of the Crossrail or Network Rail project teams are invited to attend as required		

10.1.5 Secretariat

The secretariat for this meeting is provided by the Network Rail delivery team.

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10.1.6 Quorum

There is no established quorate.

10.1.7 Frequency

Meetings of the NR PDB will be held **every four weeks**.

10.1.8 Inputs

- NR Programme period progress report
- Emerging issues within the NR On Network Works (ONW) Programme
- Costs proposed to be logged to the RAB through NR regulatory accounts
- Any proposed variations or other changes requiring CRL consent

10.1.9 Agenda

The Agenda for the NR PDB is led by the Surface Director, in conjunction with the NR Crossrail Delivery Director and may typically include:

1. Review of NR period progress
2. Review of upcoming NR On-Network Works
3. Review of emerging issues
4. Review of costs to be logged to RAB
5. Review of variations or other changes

10.1.10 Outputs

Outputs will be taken away as actions by the attendees. An issues log is maintained by Network Rail:

- Update issues log
- Issues for the Crossrail Programme Delivery Board
- Issues for other industry governance bodies (incl. ORR)

10.1.11 Governance and Authority

- The NR Programme Delivery Board is established via the original NR/CRL Commercial Agreement
- The Office of Rail and Road (ORR) are mandated to attend the NR PDB and to be provided with all copies of material correspondence relevant to its role as economic regulator
- Disputes that cannot be resolved at NR PDB can be escalated to the Crossrail CEO, Network Rail Executive Director and DfT Director of Projects – ORR has agreed to resolve referred disputes where related to Delivery Incentives, Initial CRL Charge and CRL Financing Charges

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10.2 BAA (HAL) Interface Steering Board

10.2.1 Purpose

The purpose of the BAA Interface Steering Board is to resolve all working issues relating to the interface between BAA (including HAL and HEX) and Crossrail as set out in the CRL/BAA Joint Interface Plan.

10.2.2 Objectives

The objectives of the BAA (HAL) Interface Steering Board are to:

(i)   Agree the CRL/BAA joint interface objectives

(ii)   Maintain the RACI obligations matrix within the CRL/BAA Joint Interface Plan

(iii) Review progress of works within the HAL/HEX branch of Crossrail, particularly relating to signalling and control (e.g. ETCS, GSM-R)

(iv)   Review issues escalated from the following Heathrow Working Groups

      a. Operations and Technical

      b. Commercial Planning

      c. Delivery Planning

10.2.3 Chair

Chair: Surface Director ▇▇▇▇▇▇

10.2.4 Membership

Standing Membership		
Organisation	Title	Name
Crossrail	Surface Director	▇▇▇▇▇▇
HAL	Heathrow Airport Limited	▇▇▇▇▇▇
HAL	Heathrow Airport Limited	▇▇▇▇▇▇
By Invitation - other members of the Crossrail or Network Rail project teams are invited to attend as required		

10.2.5 Secretariat

The secretariat for this meeting is provided by the Crossrail Surface Team.

10.2.6 Quorum

There is no established quorate.

10.2.7 Frequency

Meetings of the BAA Interface Steering Board will be held **every four weeks**.

10.2.8 Inputs

- Operations and Technical Working Group
- Commercial Planning Working Group
- Delivery Planning Working Group

10.2.9 Agenda

The Agenda for the BAA Interface Steering Board is led by the Surface Director. However, it could include:

1.   Operational Issues – operations concept, regulatory environment, matters relating to Train Operating Companies and track access
2.   Technical Issues – technical interface of Crossrail rolling stock with HEX branch, ETCS signalling and GSM-R

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3.   Commercial Issues – cost allocation issues and reviews of scope
4.   Delivery Issues – progress of any works being delivered by Network Rail

10.2.10   Outputs

Outputs will be taken away as actions by the attendees.

Escalations will be to the Crossrail Programme Delivery Board.

10.2.11   Governance and Authority

- The BAA (HAL) Interface Steering Board is established via the original CRL/BAA Joint Interface Plan and as agreed via the meeting minutes of 19th July 2011
- The BAA Interface Steering Board does not make decisions on behalf of Crossrail, and reviews progress within scope of the CRL/BAA Join Interface Plan. Any interface issues requiring a decision are escalated to the Crossrail Programme Delivery Board.

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10.3 Heathrow Airport Review Panel (HAL ARP)

10.3.1 Purpose

The purpose of the Heathrow Airport Limited Assurance Review Panel (HAL ARP) is to:

- assist the Director, Engineering & Asset Management in the review and endorsement of the operational and technical consequence to the Route, of major projects, submitted by major project programmes, that impact on and could import risk to Route infrastructure
- and/or propose major change to Route infrastructure and operations, that could import risk and or cause major change to Route maintenance systems and processes or import performance risk
- review impact on HAL and at the interfaces.

10.3.2 Objectives

The objectives of HAL ARP are to:

i. Consider that the Project has a managed process for safety assurance in design, asset protection, installation and testing.

ii. Obtain assurance that the design is fit for Route and project purpose, can be maintained post installation before bringing into full use and during its life-time and introduction into service.

iii. Understand Project Programme timescales and work with the Project to assist their progress.

iv. Understand the effect on the Route's infrastructure during the programme.

v. Consider the maintenance consequences during the project programme and thereafter.

vi. Make sure the Route is clear in how it's responding, by responding with "one voice",

vii. Facilitate consultation/discussion with the TOC's/FOC's.

10.3.3 Chair

Chair: HAL Chair (independent nominee)

10.3.4 Membership

Standing Membership		
Organisation	Title	Name
HAL	Chairman	███████████
HAL	Managing Director	
HAL	Head of Rail Director	
HAL	Engineering & Asset Management Route IM Director	
HAL	Route Asset Managers – address specific discipline	
HAL	Route General Managers	
HAL	Process Manager for HAL ARP	███████████
CRL	Client Coordinator Manager	████████
By Invitation - Invited technical experts and/or representatives of 3rd parties.		
The Group will be attended by the Project Programme Principals for their relevant item(s) to make/support presentation of submissions in accordance with the above.		

10.3.5 Secretariat

The secretariat for this meeting is the HAL ARP Process Manager ███████████

10.3.6 Quorum

At the meeting prior to each submission, the regular core members shall decide the competencies required to consider the submissions at the next panel meeting. For the panel to be deemed quorate it shall have as a minimum a Chair, two other regular core members, and the HAL Process Manager.

10.3.7 Frequency

Meetings of the HAL ARP will be held **as required**. The frequency of the HAL ARP meetings shall be decided by its Chairman in consultation with Heathrow Express.

10.3.8 Inputs

- Safety case documentation relating to key systems and subsystems for Heathrow Express
- Briefings to HAL ARP on systems/subsystems and the associated safety assurance process

10.3.9 Agenda

Reviews carried out by HAL ARP will be high level in nature and concentrate on the adequacy of the safety case or assessment produced by the project and its contractors. The objectives will be to:

a) Confirm that the Safety Case(s) covering the system/subsystem or effect on Heathrow Express owned infrastructure and operational systems is acceptable
b) Confirm that the Project has a managed process for safety assurance in design, installation, testing and operational implementation.
c) Provide assurance that the design is capable of delivering safety in operation, i.e. it will work.

10.3.10 Outputs

- HAL ARP will either accept or reject a safety submission.
- Accepted submissions will be certificated, and those certificates will be signed by the HAL ARP Chairman, Heathrow Express Head of Infrastructure and Heathrow Express Managing Director.
- When rejecting a submission the HAL ARP will detail the reasons for concluding that the case for safety has not been adequately described (with reference to the acceptability tests).
- The HAL ARP Chairman will reports on progress and key issues to Heathrow Express as required, and to facilitate this shall consult others as necessary on interface hazards e.g. NR and LU.

10.3.11 Governance and Authority

- The HAL ARP is <u>not</u> a Crossrail meeting and is included here for completeness only
- HAL ARP is mandated to review and accept submissions, as they relate to the Heathrow Express systems and sub-systems, on behalf of Heathrow Express and NR
- In the event submissions are considered inadequate the HAL ARP will work with Heathrow Express, NR, and the Heathrow Express Project contractors, to discuss and resolve issues of concern
- In the event of repeated failure of the Project and HAL ARP to agree that a particular aspect of a system/sub-system is acceptable the Heathrow Express Head of Infrastructure and the Chairman of the HAL ARP will meet to review the issues involved. They may elect to commission an independent assessment of the evidence before commenting on the issues involved.
- HAL ARP does not consider cost and other commercial matters. Issues of reliability, availability and maintainability shall only be considered so far as they affect human safety, and system safety.

10.4 Other Crossrail Surface Directorate Tier 4 Working Groups

In addition to the documented terms of reference described within this chapter, the following working groups regularly meet on a periodic basis to work through progress and track issues and opportunities related to the On Network Works. These include:

- NR/CRL East

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- NR/CRL South-East Spur
- NR West Old Oak Common/Paddington Approaches
- NR West - West Inner
- NR West - West Outer
- Ilford Depot Working Group
- DOO CCTV Steering Group

There are also a series of Network Rail Route meetings that are of relevance to the Crossrail Programme that take place in the West and East.

The relationships between these meetings, and the Crossrail Programme, are illustrated in more detail in Appendices 19.4 – Crossrail-NR Governance and Interface Meetings

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11   Technical Directorate - Terms of Reference

11.1 Technical Authority Group

11.1.1 Purpose

The purpose of the Technical Authority Group (TAG) is to provide technical control of the programme by coordinating the exercising of Technical Authority in order to assure compliance of the Crossrail Central Operating Section is achieved in a timely and efficient manner.

11.1.2 Objectives

The objectives of the TAG are to:

(i)   Review any escalated technical issues - in particular, those related to integration of the Central Section stations, portals, shafts (and railway systems) necessitating a coordinated response.

(ii)   Issue any instructions necessary to ensure that the design standards specifications and Sponsor's Requirements are met and, if not, to identify the necessary resolution path

(iii)   Review and agree any technical items included within Change Proposals that may impact on Functional or Sponsors Requirements, and oversee any changes to technical requirements

11.1.3 Chair

Chair: Chief Engineer ████████████

11.1.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Chief Engineer	████████
Crossrail	Head of Bulk Power	█████
Crossrail	Head of Communications and Control	████████
Crossrail	Head of Signalling & PSD	█████████
Crossrail	Head of MEP	██████
Crossrail	Head of Architecture	███████
Crossrail	Head of Civil Structures	████████
Crossrail	Principal Engineer, Rolling Stock and Depots (RfL)	████
Crossrail	Lead MEP Engineer	█████
Crossrail	Head of Technical Assurance	██████
Crossrail	Head of Contracts Administration and Management	█████
Crossrail	Manager of Engineering Stations	███████
Crossrail	Manager of Engineering Civils, Depots and Sidings	██████
Crossrail	Manager of Engineering Railway Systems	████
Crossrail	Testing and Commissioning Manager	████
Crossrail	Lead Requirements Engineer	███████
Crossrail	Head of Sustainability and Consents	████
Crossrail	Head of Change Control	██████
Crossrail	Lead Track Engineer	███████
Crossrail	Configuration Manager	████████
Crossrail	Stations Construction Manager	█████
Crossrail	Programme Baseline Manager (Change Control)	██████
RFLI	Head of Engineering RfL Crossrail	███████
LU	Principal Project Engineer, LUCT	███████
By Invitation - such other senior managers and engineers as the TAG considers appropriate		

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11.1.5 Secretariat

The Secretariat is provided by the PA to the Technical Director.

11.1.6 Quorum

The meeting is quorate with four members present including the Chief Engineer ████████ or appointed deputy, Head of Change Control ████████ Head of Contracts Administration and Management ████████ and the relevant technical Head of Discipline.

11.1.7 Frequency

Meetings will be held every **two weeks** for a duration of **2 ½ hours**.

11.1.8 Role and Functionality
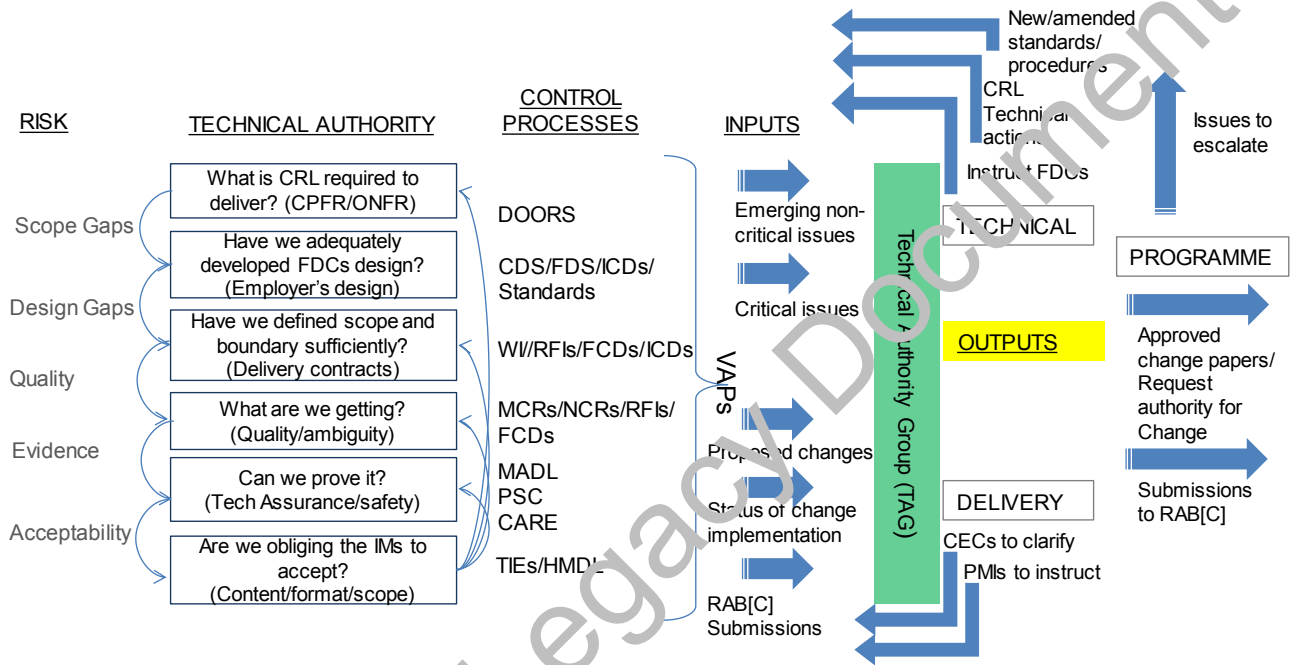
Figure 6 – Role and Functionality of the Technical Authority Group (TAG)

11.1.9 Inputs

The TAG will consider any escalated technical issues identified by a standing member as requiring resolution through the TAG, as illustrated in Fig. 6.

- Critical issues (requiring urgent technical resolution to support the Delivery programme)
- Emerging quality, new scope or descoping issues;
- Any early warnings of value engineering proposals, or other potential change
- Changes in standards, legislation or regulations that could affect the Requirements
- Any new, or revised, major technical procedures requiring TAG approval
- Proposed changes could have a potential technical impact on the baseline Requirements
- Implementation status of instructions; and
- RAB (C) safety case submissions.

11.1.10 Agenda

The TAG will act as the technical context requires in advising, assisting, and making recommendations in order to facilitate its remit to support the compliant delivery of the Central Operating Section.

A typical agenda for a meeting will be as follows:

- Review of critical issues tracker (30 minutes);
- Review of VAP implementation and progressive assurance (30 minutes);

- Review summary of implementation status of existing instructions (20 minutes);
- Approve draft instructions to be issued, and new to be drafted (20 minutes); and
- Technical review of change papers (30 minutes).

Alternate TAG meetings may review (20 minutes):

- RAB(C) submissions
- Standards/legislation/TSI/regulations
- Gates dashboard and status
- New or revised technical procedures

11.1.11 Outputs

- The TAG will ensure that each issue raised to it has an identified action to ensure its resolution.
- It will also approve, conditionally approve or reject each change paper, new or revised technical assurance procedure, or safety submission, raised to it.

Identified actions and instructions could include:

- Drafting of instructions for future consideration (CECs/PMIs/change proposals)
- Considering instructions for approval (CECs/PMIs/change proposals)
- Determining internal actions to be taken within the Technical Directorate, including further work by TAG members (potentially through working groups to report back at the next TAG)
- Issuing new or revised technical assurance, or design standard documents, once the impact assessed, and making approved submissions to RAB(C)
- Confirming approved change papers into the next step of the Crossrail change process, or requesting authority for any new changes as identified
- Escalating issues that cannot be resolved at the TAG, or delegating/transferring issues that are not best addressed at the TAG

11.1.12 Governance and Authority

- The TAG meets with the Technical Authority of the Chief Engineer, who has accountability for discharging the Technical Authority (the Scope) on behalf of CRL from the Programme Director
- Technical Authority is taken to mean the authority (and obligation) to act on behalf of Crossrail to discharge its technical obligations in accordance with the PDA and its Agreements
- This empowers the Chief Engineer to act on behalf of CRL to make technical decisions, including any further delegation of technical authority to the various parts of the organisation, and thus enable CRL to manage and deliver the Crossrail Project
- The TAG may establish working groups as it sees fit to consider and address specific issues on its behalf, but may not delegate its authority to such groups
- The TAG sits within the broader Crossrail governance structure. It can escalate issues to the Programme Delivery Board, or directly to the Programme Director, as it sees appropriate
- The TAG supersedes the Chief Engineers Communication Forecast Meeting (CFC Meeting) and the Technical and Client Review Group (TCRG) which have been amalgamated within it
- The TAG has no change authority
- The TAG shall keep these Terms of Reference under review and make recommendations to the Technical Director and Programme Director if and when changes are needed

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11.2 Test, Commissioning and Configuration Review Panel (TCCRP)

11.2.1 Purpose

The purpose of the Test, Commissioning and Configuration Review Panel (TCCRP) is to act as Crossrail's systems integration authority, in regards to the high level configurations of systems being tested, and to coordinate staged deliveries and approved changes (hardware, software or data), to best support the needs of the programme during static integration testing, and dynamic testing.

11.2.2 Objectives

The scope of the TCCRP includes the assets and systems comprising the Central Operating Section, the Crossrail Integration Facility (CIF), and interfaces with third parties such as NR, LU, Rolling Stock, Depots, OSD, National Grid, and other design interfacing organisations.

The TCCRP shall utilise the criteria below to judge the disposition of each new development drop or change;

- Alignment with T&C priorities and timing, in particular;
    - Functional criticality;
    - Impact on interfacing functionality and performance
    - Risk profiles including levels of regression testing posed by changes
- Impact on engineering safety;
- Impact on operations and maintenance involvement in support of testing ;
- Level of work-arounds that may be required.

11.2.3 Chair

Chair: Chief Engineer ███████████

Deputy Chair: T&C Manager ██████████

11.2.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
CRL Technical	Chief Engineer – Chair*	██████████
CRL Delivery	T&C Manager – Deputy Chair*	██████████
CRL Delivery	Central Section Director*	██████████
CRL Technical	Engineering Configuration Manager – Panel Secretary*	██████████
CRL Technical	Head of Integration	██████████
CRL Operations	Principal Engineer, Rolling Stock &	██████████
CRL Technical	Head of Signalling &PSDs	██████████
RfLI	Head of Engineering	██████████
By Invitation – LU/Network Rail/ Contractors / Technical Specialists as required by scenarios		
CRL Technical	Head of Comms &Control	██████████
CRL Technical	Head of MEP	██████████
CRL Technical	Head of Bulk Power	██████████
CRL Technical	Head of Track	██████████
CRL Technical	Head of Traction Power & OHLE	██████████
CRL Delivery	Lead Crossrail Integration Facility Engineer (Rig Master role).	██████████
CRL Delivery	Dynamic Testing Manager	██████████

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CRL Surface	Surface Director	████████
NR	Network Rail Engineering Manager	█████████
LUCT	Principal Project Engineer	███████████
RfLI	Head of Maintenance and RAM	████████
MTR-C	Head of Assurance	███████
By Invitation – generic roles as required (Project Managers, Engineering Manager and Contractor Representatives)		

11.2.5 Secretariat

The Secretariat for this meeting is provided by the Engineering Configuration Manager.

11.2.6 Quorum

Quorate is indicated by the asterix * in the membership table above. Quorate members would be expected to arrange for delegates during any absence.

11.2.7 Frequency

The TCCRP shall meet every week. The duration is anticipated to be between 1-3 hours. It is recognised that other daily review meetings are to be held to analyse and triage issues arising from the testing programme, and that some of the outputs will be inputs to the TCCRP.

11.2.8 Inputs

- Contractor configuration status reports
- Contractor ComLot Plans
- Contractor RIRs and Version Description Documents (VDDs) or equivalents;
- Software 'branch' and merge maps and release maps
- Contractor T&C delivery plans and schedules;
- Approved change requests/PMIs;
- T&C schedules, priorities, and progress status;
- T&C Test Plans;
- Field Change Documents (FCD) and Non Conformance Reports (NCRs) where they relate to potential impacts on the testing programme.

11.2.9 Agenda

A typical agenda shall include,

- Review of actions and issues;
- Proposed changes and releases
- Schedules, priorities, and risks;
- AOB.

11.2.10 Outputs

- High level system configuration status record as context for testing;
- Decisions, guidance, and actions on configurations and temporary work-arounds to assist the testing programme and goals;
- Feedback (guidance and recommended instruction) as to the timing of staged configuration deliveries, implementing changes, and/or testing;
- Chief Engineers Communications (CECs).

11.2.11 Governance and Authority

- The TCCRP shall be chaired by the Chief Engineer. The TCCRP will report into the Testing, Commissioning and Handover Steering Group, TCHSG, and its governing bodies.
- It is anticipated that given the seniority of the TCCRP membership, sufficient authority will be in place to deal with the vast majority of issues raised. Any which require rapid resolution will be

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escalated to the attention of the Programme Director and other Directors, where necessary, for direction.

- The TCCRP remit is only for interim configuration states. Any potential changes to the final system states will be via the established processes and bodies, including RAB(C), and Technical Assurance forums.
- C610 and MTR have certain responsibilities regarding safety and hazard mitigations during the dynamic test stage. As they are represented at the Testing, Commissioning and Handover Steering Group, TCHSG recommendations of configurations for interim scenarios will be escalated to the TCHSG for endorsement.
- The TCCRP shall not replace the existing Change Control process and forums, but provide a systems integrator role so that approved changes are implemented at the optimal stage to support the test and commissioning schedule.
- The TCCRP shall build on the configuration management activities of the Contractors who remain responsible for implementing control of their configurations according to the Works Information.
- In respect of project lifecycle, the scope of the TCCRP covers; integration static testing; and dynamic testing. Other phases, such as Design are deemed to have sufficient process and working group attention (eg TAG, Gate Impact Reviews, CECs, etc).
- Panels for future phases such as Trial Running will be mandated by the Infrastructure Manager as they see fit.

11.3 Cyber Security Steering Group (CSSG)

11.3.1 Purpose

The purpose of the Cyber Security Steering Group (CSSG) is to provide senior cyber security governance and ensure assurance is established, against the identified cyber risks, across the Crossrail Project. The CSSG's emphasis will be on delivering a safe railway and infrastructure with appropriate cyber security safeguards in place.

11.3.2 Objectives

The objectives of the Cyber Security Steering Group are to:

   i.   Agree and take ownership of Crossrail's cyber security principles, strategy and policies;
   ii. Ensure the cyber security strategy is implemented, through a work plan allocating responsibility for individual work streams and overseeing their completion;
   iii. Monitor progress against the work plan and prioritise resources, if necessary

11.3.3 Chair

Chair: Programme Director ██████████

Deputy Chair: Technical Director ██████████

11.3.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Programme Director	██████████
Crossrail	Technical Director	██████████
Crossrail	Chief Engineer	██████
Crossrail	Head of Communications and Control	██████████
Crossrail	Director of Health & Safety	██████████
Crossrail	Head of Technical Information	██████████
RFLI	Head of Engineering Infrastructure	██████████
Crossrail	Programme Integration Manager	██████████
By Invitation – such other senior managers and engineers as the Cyber Security Steering Group considers appropriate		

11.3.5 Secretariat

The Secretariat is provided by the Programme Integration Manager ██████████

11.3.6 Quorum

This meeting is quorate with at least **two** members present, including either the Programme Director or Technical Director, and either the Programme Integration Manager or Chief Engineer

11.3.7 Frequency

Meetings will generally be held every **four weeks** for a duration of **one hour,** or as required

11.3.8 Inputs

*   One-page work stream progress reports
*   Cyber Security - actions tracker (with priority filter)
*   Presentations/Investment/change papers (as required)

11.3.9 Agenda

A typical agenda for a meeting may be as follows:

*   Review cyber security workstream progress reports, and actions tracker
*   Review 'readiness' of RfL to support cyber security in operations (as required)

- Review costs/benefits of network monitoring system (as required)
- Review the implementation and closure of any CEC/PMIs
- Confirm any escalations required (as required)

11.3.10 Outputs

- Agreed actions, with priorities, owners and due dates
- Technical issues, or draft instructions, to escalate to the TAG
- Endorsed investment/change papers to CCSC

11.3.11 Governance and Authority

- The Cyber Security Steering Group (CSSG) is a bespoke, time-limited forum that has been established to provide leadership and senior management oversight of cyber security
- The CSSG will meet with the Technical Authority of the Chief Engineer, and the Technical Director who is the Senior Information Risk Owner (SIRO), under the chairmanship of the Programme Director/Technical Director
- The CSSG will sit within the Technical Directorate, but the Operations Directorate will also be substantially engaged in its work.
- Technical issues relating to Cyber Security within the Central Operating Section delivery programme will be escalated to the TAG as required, which will also review the technical impact of any change proposals, and draft instructions.
- The CSSG will make recommendations only. All programme change proposals will be required to follow the Crossrail change control process.
- The CSSG will keep this ToR under review and make recommendations to the Technical and Programme Director as and when changes are needed
- This meeting will last until the scope of this terms of reference has been discharged, or until otherwise agreed by the Technical Director

11.4 Systems Integration Review Panel (SIRP)

11.4.1 Purpose

The core purpose of the Systems Integration Review Panel (SIRP) is to oversee scenario-based testing of the operability of the designs of the Central Operating Section assets, and their capability with the operators' equipment, procedures and plans, as expressed in the Operations concepts.

11.4.2 Objectives

The objectives of the SIRP are to:

- Assure operability of COS assets, and support resolution of interface hazards by ensuring these are captured within the Project Wide Hazard Record (PWHR)
- Review and assess the implication of change (either design or operational) as instructed by the Technical Authority Group
- Propose the appropriate method of evaluation – e.g. SIRP workshop, Hazard Review Panels (HRPs), and further study – if further analysis is required
- Agree the scope of any scenario based assurance, and its timing
- Track the ownership, dissemination and resolution of any actions arising from the above, determine escalation of issues relating to this process and report through the Technical Authority Group, or Programme Delivery Board, if required.

11.4.3 Chair

Chair: Head of Crossrail Operations and Maintenance Interface ▮▮▮▮▮▮▮

Deputy Chair: Members may elect a Deputy for the meeting in the absence of the Chair

11.4.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Head of Ops and Maintenance Interface	▮▮▮▮▮▮▮
Crossrail	Head of System Safety	▮▮▮▮▮
Crossrail Operations	Deputy Director of Operations	▮▮▮▮
Crossrail	Head of Integration	▮▮▮▮▮
RFLI	Head of Maintenance and RAM	▮▮▮▮
RFLI	Maintenance Planning Engineer	▮▮▮▮▮▮
Crossrail Operations	Operations Standards Manager	▮▮▮▮
Crossrail Operations	Operations Business Manager	▮▮▮
RFLI	RfL Head of Engineering	▮▮▮▮▮
Crossrail Operations	Lead Rolling Stock Engineer	▮▮▮
Crossrail Technical	Maintenance Planning Engineer	▮▮▮▮▮▮▮▮
Crossrail	Head of Technical Assurance	▮▮▮▮▮
MTR Crossrail	Head of Assurance	▮▮▮
P-Rep	Project Representative	▮▮▮
By Invitation – LU/Network Rail/ Contractors / Technical Specialists as required		

11.4.5 Secretariat

The Secretariat for this meeting is provided by the Crossrail Head of Operations and Maintenance Interface.

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11.4.6 Quorum

There is no established quorate. However, the SIRP will require Technical, Operations and IM representation to work through scenarios related to operating concepts and design change.

11.4.7 Frequency

Meetings will be held as required. Additional SIRP meetings may be called as agreed by the Chair.

11.4.8 Inputs

SIRP inputs will be formed through 'use case' (i.e. instances of use) analysis, an approach which has been successful on other projects, such as Thameslink. SIRP aims to capture all scenarios where the user interacts with the system, and where those scenarios are characterised by novelty, complexity or particular operability risks leading the panel to require use case analysis.

11.4.9 Agenda

The panel shall:

- Where required, review and assess the implication of change (either design or operational).
- Propose the appropriate method of evaluation, e.g. SIRP2 workshops, further study.
- Agree the scope (e.g. definition of scenarios) and timing.
- Track for completeness, ownership, dissemination and resolve any actions arising.

11.4.10 Outputs

- SIRP will capture, record and circulate the outputs of all its workshops to all attendees
- SIRP will report identified issues into the Systems Technical Authority
- SIRP will provide support to associated workstreams, including Rule Book and local instruction writing, and the development of training packages for operating personnel.

11.4.11 Governance and Authority

- SIRP is a key integration meeting in driving operations integration into delivery of the railway. It will set-up subsidiary SIRP Workshops to define scenarios as per the SIRP Workshop Guidelines CRL1-XRL-O8-GUI-CR001-50001
- The SIRP does not have change authority; however, its members are able to make recommendations on aligning Operating Concepts with design and delivery by consensus, or escalate broader issues to the Technical Authority Group.

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11.5 Maintenance Steering Group (MSG) - MIRPs

11.5.1 Purpose

The purpose of the Maintenance Steering Group (MSG) is to manage the alignment of design and maintenance plans through the MIRP (Maintenance Integration Review Panel) Workshops to meet the Sponsors Requirements for the operational railway.

11.5.2 Objectives

The objectives of the MSG are to:

- Manage the implementation of the Maintenance Development Plan (including relevant interfaces) in order to create a maintenance regime that will meet the Sponsors Requirements and CPFR.
- Ensure alignment between the integrated designs and maintenance plans, recognising the constraints and performance requirements of the operational railway.
- Ensure that the relevant IMs are ready and the programme deliverables are in place and agreed for each opening stage of Crossrail.
- Review and assess the implication of change (either design or operational) on maintenance as required. The group shall deploy relevant techniques (e.g. MIRP workshops / bespoke reports)

11.5.3 Chair

Chair: Maintenance Planning Engineer ███████████

Deputy Chair: Members may elect a Deputy for the meeting in the absence of the Chair

11.5.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Maintenance Planning Engineer	████████████
Crossrail	Head of Crossrail Ops and Maintenance	████████████
Crossrail	RAM Engineer	████████
Crossrail	Head of System Safety	████████
Crossrail	Head of Technical Information	████████████
Crossrail	Head of Integration	████████
Crossrail (AMCL)	Secretariat	██████
RFLI	Maintenance Planning and Performance	████████████
RFLI	RAMs Manager	████████
RFLI	RfL Head of Engineering	████████████
RFLI	Engineering Maintenance Manger	██████
Crossrail Operations	Yellow Plant PM	██████
London Underground	Asset Performance Directorate – Rep	████████
London Underground	Asset Performance Directorate – Rep	████████
Network Rail	Route/SPM representative	██████████
Network Rail	Route/SPM representative	████████
Crossrail	Head of Technical Assurance	██████████
P-Rep	Project Representative	████████
By Invitation – MTR / Contractors / Technical Specialists as required		

11.5.5 Secretariat

The Secretariat for this meeting is provided by the Maintenance Planning Engineer, or designee.

11.5.6 Quorum

There should be representatives from CRL, RfL, LU and NR to be quorate. MSG will require Technical, Operations and IM representation (LU/RfL) to work through scenarios related to maintenance principles and design change, including MTR as required.

11.5.7 Frequency

Meetings will be held every **4 weeks**. Additional MSG meetings may be called as agreed by the Chair.

11.5.8 Inputs

The development and resolution of the following areas shall be tracked by the MSG for the Central Operating Section routeway, including interfaces with rolling stock, network rail and stations:

- Maintainer Readiness
- Minimum Operating Requirements
- Definition of Asset Criticality
- Definition of Maintenance Boundaries
- Maintenance Resources (people, plant, equipment and location)
- Deployment of multi stakeholder working parties and the MIRP process to evidence the successful integration of individual maintenance strategies and plans
- Deployment of CMCM
- Deployment of WLC model

11.5.9 Agenda

Meetings will cover the following areas:

(i) Development and review of progress against a schedule of activities
(ii) MIRP workshops to be held, and MIRP workshops outputs
(iii) Other issues arising

Specific agenda items will be determined and notified prior to each meeting as relevant.

11.5.10 Outputs

- The Maintenance Steering Group shall report to the Technical Authority Group, on Maintenance progress and decisions of the MSG and advise on any issues raised following each meeting.
- The MSG shall maintain an Issues Register which it will track for completeness, ownership, dissemination and resolution of any actions

11.5.11 Governance and Authority

- The Maintenance Steering Group will undertake an annual review of its performance, the relevancy of its terms of reference and other related matters.
- The MSG shall report to the Technical Authority Group.
- The Maintenance Steering Group may establish dedicated MIRP working groups or deploy means to consider specific issues on its behalf and report back with their recommendations.
- Any recommended change to baseline scope, programme or maintenance concept shall require the endorsement of the TAG and approval through Crossrail change control.
- The MSG does not have change authority; however, its members are able to make recommendations on aligning Maintenance Concepts with design and delivery by consensus, or escalate broader issues to the Technical Authority Group.

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11.6 Hazard Review Panel

11.6.1 Purpose

The purpose of the Hazard Review Panel is to review actions for hazards that cannot be mitigated through design or still remain intolerable after design mitigations have been implemented.

11.6.2 Objectives

The objectives of the Hazard Review panel are to review and determine the appropriate action for:

- Hazards that cannot be mitigated by design and require a future Infrastructure Manager or train operator to manage via operational rules and regulations and/or maintenance
- Hazards that remain intolerable after the hazard mitigations have been implemented

11.6.3 Chair

Chair: Head of System Safety ████████████

11.6.4 Membership

By Invitation – membership of the HRP will be customised for each meeting. A typical list is below:		
Organisation	**Title**	**Name**
Crossrail	Head of System Safety	████████████
Crossrail	Chief Engineer (or nominee)	██████
Crossrail	Manager of Engineering Systems	████████
Crossrail	Rail Systems Delivery Director (or nominee)	████████
Crossrail	Maintenance Planning Engineer	██████████████
Crossrail	Head of Crossrail Ops and Maintenance	████████
Rail for London	Head of Operations & Readiness (RfL)	█████
Crossrail	Deputy Director of Operations	██████
Rail for London	Head of Maintenance and RAM	█████
Crossrail Operations	Maintenance Planning and Performance	████████
Rail for London	RfL Head of Engineering	████████
Network Rail	NR Representative	███
London Underground	LU Safety Lead	██████████
MTR Crossrail	Head of Assurance	██████

11.6.5 Secretariat

The Secretariat for this meeting is provided by a nominee of the Head of System Safety

11.6.6 Quorum

There is no established quorate. The HRP will determine the appropriate attendees for each meeting through the Head of System Safety.

11.6.7 Frequency

Hazard Review Panels will be convened on an as-and-when required basis with the Contractors responsible for identifying hazards that cannot be mitigated by design and require a future infrastructure manager or operator to manage via operational rules, and regulations, and/or maintenance.

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11.6.8 Inputs

The HRP will receive:

- Project Wide Hazard Record (PWHR) for the design contract
- Extracted Safety Issue Files describing what is proposed to be transferred as an action
- Any other supplementary information relevant to understanding of the hazard

11.6.9 Agenda

Meetings will review each hazard to confirm:

(i)   If the mitigations proposed to the IM/Operator are clear
(ii)   Where appropriate, whether mitigation responsibility is agreed to be transferred to a future IM/Operator

Specific agenda items will be determined and notified prior to each meeting as relevant

11.6.10   Outputs

- The HRP will recommend the action to be taken on each hazard. If these result in a need for a change proposal, these changes will be submitted using the change process under the oversight of the Technical Authority Group and Railway Assurance Board (Crossrail) where required
- The HRP will produce minutes of each meeting with an actions tracker for the logging and closing of actions
- Additionally the HRP will be responsible for populating the Safety Issues File (SIF) which will capture all risk control actions that a future IM/Operator will have responsibility to manage via their Safety Management System

11.6.11   Governance and Authority

- The HRP shall report to the Railway Assurance Board (Crossrail) where a safety impact is identified
- In addition, the HRP shall report to the Technical Authority Group where a technical impact is identified, as required
- The HRP does not have change authority; however, its members are able to make recommendations on mitigation for hazards that can then subsequently inform the change process

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11.7 System Safety Steering Group

11.7.1 Purpose

The purpose of the System Safety Steering Group (SSSG) is to provide future Duty Holders with visibility and due diligence of the ESM activities carried out by CRL and its contractors, in order to facilitate Handover from the engineering safety point of view.

11.7.2 Objectives

The objective of the SSSG is to build the confidence with the future Duty Holders that suitable and sufficient safety assurance will be provided by CRL before handover. To do this, this Group will:

- Review ESM progress of all stakeholders (Crossrail, the contractors and the Duty Holders)
- Consider the planned activities to assess the need to involve the Duty Holders, and to escalate any concerns as necessary to ensure the ESM process is correctly applied by relevant parties
- Ensure that the ESM process is working adequately to address IMs/Operators expectations and amend, if necessary, to meet its objectives
- Review safety issues which require specific attention and monitor the actions taken to deal with them. For example those risks that are:
  - Due to new, novel or complex functionality (e.g. auto-reverse)
  - Not addressed by a single contract (e.g. signalling transition)
- Review the progress of studies undertaken in the development of the safety risk model.

11.7.3 Chair

Chair: Technical Director ██████████

11.7.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Technical Director	███████
Crossrail	Head of Integration	███████
Crossrail	Director of H&S	███████
Crossrail	Head of System Safety	███████
Crossrail	Interoperability Manager	███████
Crossrail	System Safety Team members (as required)	
RfL	RfL Head of Engineering	███████
RfL	Head of Safety	███████
RfL	Safety Engineer	███████
MTR [C]	Head of Safety	███████
LUL	LU Safety Lead	███████e
Ricardo Rail	AsBo/NoBo Leads	███████
Crossrail	Regulatory Engineer	███████
By Invitation - Contractors / Technical Specialists as required		

11.7.5 Secretariat

The Secretariat for this meeting is provided by the Head of Systems Safety, who will be responsible for ensuring that all logged actions are implemented.

11.7.6 Quorum

There is no established quorate. However, the System Safety Steering Group will invite a representative from RfL, MTR, LUL, NR and Crossrail each time it meets, as required.

11.7.7 Frequency

The System Safety Steering Group will be convened every period, and as necessary.

11.7.8 Inputs

- PWHR status
- ESM evidence
- Design Engineering Safety Justifications (DESJ) status
- Engineering Safety Justifications (ESJ) status
- Interim Safety Justifications status
- Safety Justifications status
- New, novel or complex products

11.7.9 Agenda

The System Safety Steering Group will follow this agenda:

- ESM progress to date
  o Safety deliverables
  o PWHR status
  o Safety analyses and assessments,
- ESM work to come
  o ESM to be done before Gates/Major milestones
  o Hazards/Risk Control Actions to be transferred to the IMs
- Process issues (e.g. structure and content of the Safety Justifications, impact on CRL ESM process of the RfL Product Acceptance Procedure, etc.)
- Safety issues (especially risk due to new, novel or complex functionality or risk not owned by a single contractor)
- Safety Risk Model studies and progress

11.7.10   Outputs

- Agreed schedule of safety arguments and associated configurations
- Minutes of meetings
- Action tracker – which, in particular, will note any issue which would jeopardize the APIS or the acceptance of the completed railway by the future Duty Holders and escalate formally, as necessary.

11.7.11   Governance and Authority

- The System Safety Steering Group shall interface with the Programme Delivery Board, and Railway Assurance Board [Crossrail], on any safety issues that require resolution
- The SSSG has no change authority other than to the extent the members attending choose to exercise their own delegated authority to progress the resolution of ESM issues.

11.8 Handover Strategy Group

11.8.1 Purpose

The purpose of the Handover Strategy Group is for CRL, RfLI, LU and MTR to meet on a weekly basis to agree the actions that will most effectively optimise execution of the Handover Strategy & Plan.

11.8.2 Objectives

The objectives include:

- Agreeing the Interim Acceptance and Handover Readiness Review schedule
- Agreeing how to best de-risk Handover and Stage 3 opening, including the mitigation of challenges that risk frustrating successful and timely Handovers
- Agreeing the planning and assurance logic for Handover
- Agreeing key processes and templates to enable successful Handover

11.8.3 Chair

Chair: Head of Integration (Jeremy Bates) or Programme Integration Manager (Jonathan Morris)

11.8.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Head of Integration	███████████
Crossrail	Handover Manager (CRL)	███████████
Crossrail	Crossrail Construction Manager	████████
Crossrail	Programme Integration Manager	█████████████
RfL	Head of Engineering	█████████████
RfL	Handover Manager	████████████████
LU	Programme Manager	██████
MTR[C]	Stage 3 Delivery Manager	███████████
By Invitation - other individuals will be invited as deemed necessary, either as a group member or for specific agenda items.		

11.8.5 Secretariat: duties will be provided by the Programme Integration Manager

11.8.6 Quorum: RfL, MTR, LU, CRL Handover and CRL reps will typically be required

11.8.7 Frequency: meetings will be held **weekly**.

11.8.8 Inputs: Inputs will be defined by the priority issues identified by CRL, LU and RfL.

11.8.9 Agenda: the agenda will be circulated the day prior to each meeting. On the week prior to each PDB, the agenda will include discussion of the Top 5 issues for the period.

11.8.10   Outputs

- All actions will be recorded and communicated
- The HSG will aim to agree solutions to issues it identifies that, if they cannot be implemented within, can be taken to the appropriate forum for decision/endorsement as required
- Decisions on issues to escalate to the PDB or to further discuss at the TCHSG.

11.8.11   Governance and Authority

- The HSG will report, as required, to PDB for senior leadership decision or endorsement, and to the TCHSG for wider engagement with Delivery (including all projects and contractors)
- The HSG Group will work in tandem with the Handover Delivery Working Group (that meets periodically to review handover progress and dashboards) to resolve issues that require more detailed discussion between Crossrail and the Operators.

12 Operations Directorate – Terms of Reference

12.1 Rail for London – Infrastructure Manager Mobilisation Group

12.1.1 Purpose

The RfL IM Mobilisation Group oversees and monitors the plans, programme and progress in readiness for RfL becoming an Infrastructure Manager and operating as a separate organisation.

12.1.2 Objectives

The objectives of the RfL IM Mobilisation Group are to ensure that Rail for London is ready to become an Infrastructure Manager through mobilisation of its three main departments: Operations, Maintenance, and Engineering/Technical Groups. It will:

1) Support and review RfL's participation in CRL's assurance processes.
2) Support and review RfL's timely preparation of its (Safety) Management System, including its maintenance and operational procedures.
3) Support and review RfL's timely planning preparation and implementation of its Infrastructure Management responsibilities.
4) Support and review RfL's timely preparation of maintenance strategies, plans and requirements for specialist plant, equipment, tools, maintenance support services, spares and personnel.
5) Support and review RfL's timely preparation of operating strategies, plans and requirements for operational personnel.
6) Support and review activities and planning for Testing and Commissioning, Handover and bringing into use. Advise on the development and use of the Bringing into Use Roadmap.
7) Review and advise on items and key issues to be raised by RfL at the CRL/RfL Interface Steering Board
8) Note any changes being progressed by CRL through its change control process and any comments that RfL have on them, and
9) Consider any changes that the Operations team may wish to instigate prior to them being formally submitted.
10) Review the resource requirements to support the above activities during the delivery of Crossrail AND during its operational stage as to their adequacy and/or opportunities for savings.

12.1.3 Chair

Chair:	Operations Director ███████████
Deputy Chair:	Operations Business Manager ███████████

12.1.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
RfLI	Operations Director	████████████
RfLI	Deputy Operations Director	████████
RfLI	Head of Operations & Readiness	█████
RfLI	Operations Business Manager	████████████
RfLI	Head of Engineering	████████████
RfLI	Head of Maintenance and RAM	████████
RfLI	Head of Safety	████████████
RFLI	Operations	████████████
RfLI	Asset Engineer – Track	████████
RfL	Deputy Director (Rolling Stock/Depot)	████████
RfL	Service Delivery Manager Crossrail - RfL	████████████
RfL	Operations Programme Manager	████████

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Standing Membership		
Crossrail	Operations Area Planner	███████
By Invitation - other members of the Crossrail Operations team are invited to attend as required		

12.1.5 Secretariat

The secretariat for this meeting is provided through the Operations Programme Manager – ███████ .

12.1.6 Quorum

There is no established quorate.

12.1.7 Frequency

Meetings of the RfL IM Mobilisation Group will be held every **4 weeks**

12.1.8 Inputs

- Updates on activities of MIRP, SIRP, and the Railway Assurance Board [Crossrail].
- RfL Safety Management System
- Maintenance plans and strategies
- Opening strategies and plans
- Testing & Commissioning plans
- Bringing Into Use Roadmap and the Office of Rail and Road (ORR)
- Resource planning – recruiting/training and staffing
- Key issues/risks

12.1.9 Agenda

The Agenda for the RfL IM Mobilisation Group will be led by the Operations Director. It will typically revolve around monitoring the delivery of agreed long-term and short-term critical milestones through:

a) Points arising from department summary dashboards;
b) Examination of Stage x Mobilisation programmes;
c) Interrogation of the Directorate KPIs

It will strictly control time taken up at its meetings by devolving detailed actions to off-line groups empowered to deliver them.

12.1.10 Outputs

Outputs will be taken away as actions by the attendees. Minutes will be kept by the Operations Programme Manager. Outputs could include:

- Issues to be raised at the CRL/RfL Interface Steering Board
- Reviewed RfL Safety Management System – for submission to RAB(C)
- Reviewed maintenance/operations procedures
- CRL change proposals – with RfL comments
- Confirmed opportunities for resource efficiencies

12.1.11 Governance and Authority

- The RfL IM meets with the authority of the Operations Director

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12.2 Stage 2 & 5 Operational Readiness and Programme Integration Group

12.2.1 Purpose

The purpose of the Stage 2 & 5 Operational Readiness and Programme Integration (ORPI) Group is to review all aspects of operational readiness and programme integration for Stages 2 and 5. It will monitor readiness that Crossrail, as TfL Rail, is ready to operate the four trains per hour Paddington (high-level) to Heathrow T4 services in May 2018, and as the Elizabeth line in December 2019 six trains per hour to Maidenhead and 4 trains per hour to Reading in addition to the Heathrow services, all of which will connect to the Crossrail Central Operating Section (as per the Sponsor's Requirements).

12.2.2 Objectives

To ensure complete understanding exists between stakeholders as to the requirements for readiness and to ensure successful delivery of Stages 2 and 5. The S2 & S5 ORPI Group will encompass a review of all activities relating to dynamic testing, MTR-C operational proving, readiness for entry into service, updates from OOC ORAT, and other core activities required to deliver the Sponsor's Requirements.

12.2.3 Chair

Chair:	Head of Operations & Readiness ▓▓▓▓▓▓
Deputy Chair:	Operational Readiness Manager ▓▓▓▓▓▓

12.2.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
RfLI	RfL Operational Readiness	▓▓▓▓▓▓▓▓▓
RfLI	Crossrail Programme Integration Team	▓▓▓▓▓
RfLI	RfL Rolling Stock	▓▓▓▓▓
CRL	Crossrail Programme Risk	▓▓▓▓
NR	Network Rail Crossrail Infrastructure Projects	▓▓▓
NR	Network Rail ETCS	▓▓▓▓▓▓▓
NR	Network Rail Route Operations	▓▓▓
HAL	Heathrow Airport	▓▓▓▓▓
CRL	Crossrail Surface Team	▓▓▓▓
CRL	Crossrail Regulatory Approvals	▓▓▓▓
RfL	MTR-C Operational Mobilisation	▓▓▓▓▓
NR	Network Rail ORI Representative	▓▓▓▓▓▓
By Invitation – others who have an interest in the readiness programme are invited to attend as required, or whose activities will directly affect the testing, integration and readiness programme.		

12.2.5 Secretariat

The secretariat for this meeting is provided through the Operations Readiness Manager – ▓▓▓▓▓ .

12.2.6 Quorum

A Chair is required from the RfL Operational Readiness team for the meeting to be quorate. The group will have authority to make decisions within the bounds of compliance with the requirements and standards of the core members attending from their respective organisations.

12.2.7 Frequency

Meetings of the S2&5 ORPI Group will be held every **4 weeks**

12.2.8 Inputs

- ORPI tracker (Stages 2 and 5)

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- PDB Dashboard (Stages 2 and 5)
- NR ORI, CRL Mobilisation Ops Working Group and Great Western Class 345 testing group on progress and issues

12.2.9 Agenda

A typical agenda will include:

- A detailed review of the current ORPI tracker and PDB Dashboard relating to readiness of Stages 2 and 5, and progress to date;
- A review of updates (by exception) from each core member on their work streams based on the RAG status of their organisation's project plan(s), or the Group's trackers;
- Any specific mobilisation requirements relating to MTR-C, HAL, Network Rail or Bombardier
- Agreement on actions going forward

12.2.10 Outputs

- Each meeting will be recorded with agreed actions assigned and reviewed at the following meeting until completed.
- Minutes of meetings will be circulated to group members and to others as deemed necessary by the Chair.
- Escalation of items for consideration at Crossrail PDB, via All Stages ORPI, with a timescale for resolution, will be agreed as required.

12.2.11 Governance and Authority

- The group will report progress via the All Stages ORPI to the Programme Delivery Board (PDB).
- Network Rails Operational Readiness and Integration meeting will provide additional governance for Stages 2 and 5 in relation to activities specifically concerned with Network Rail infrastructure. The RfL Operational Readiness team will provide a representative at ORI and extend an open invitation for a representative of ORI to attend the Stages 2 and 5 ORPI group meetings.
- Members of the group will be assigned by the Chair to liaise with relevant individuals and groups for resolution of issues.
- These terms of reference may be changed and developed going forward as the project progresses to accommodate additional testing related tasks.

12.3 Stage 3 Elizabeth Line Readiness Steering Group

12.3.1 Purpose

The purpose of the Stage 3 Elizabeth Line Readiness Steering Group (ELRSG) is to review all aspects of readiness to make sure the Elizabeth line is ready for Trial Running and Trial Operations, on the 5th August 2018 and 9th September 2018 respectively, and passenger operations on 9th December 2018.

12.3.2 Objectives

To ensure understanding exists between stakeholders as to the requirements for testing and readiness through the various phases of Stage 3 and make sure the launch of the Elizabeth line is a success. The Stage 3 ELRSG will encompass a review of all activities relating to Dynamic Testing, Handover, Trial Running, Trial Operations and readiness for entry into service, and provide a focus point for operational activities/dependencies relating to the Testing, Commissioning and Handover phases.

12.3.3 Chair

Chair:　　　　　　　Head of Operations & Readiness ████████

Deputy Chair:　　　Operational Readiness Manager ████████

12.3.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
RfLI	RfL Operational Readiness	████████
RfLI	Deputy Operations Director	████
RfLI	RfL Rolling Stock	████████
RfLI	RfL Maintenance	████
RfLI	RfL Engineering	█████
RfLI	RfL Concession	█████
CRL	Head of Integration	█████
CRL	Crossrail Programme Risk	███
CRL	Testing and Commissioning Strategy Manager	█████
NR	Network Rail Route Operations	███
CRL	Crossrail Surface Team	████
CRL	Crossrail Regulatory Approvals	██
RfL	MTR-C Operational Mobilisation	████
MTR	Stage 3 Delivery Manager	████████
LU	Head of LU Crossrail Team	████
NR	Network Rail ORI Representative	██████
TfL	Head of Integrated Elizabeth Line Marketing	██
CRL	P-Rep	████
By Invitation - others who have an interest in the readiness programme are invited to attend as required, or whose activities will directly affect the testing, integration and readiness programme.		

12.3.5 Secretariat

The secretariat for this meeting is provided through the Operations Readiness Manager – ████████.

12.3.6 Quorum

A Chair is required from the RfL Operational Readiness team for the meeting to be quorate. The group will have authority to make decisions within the bounds of compliance with the requirements and standards of the core members attending from their respective organisations.

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12.3.7 Frequency

Meetings of the Stage 3 ELRSG will be held every **4 weeks**.

12.3.8 Inputs

- Updates on dynamic testing, handover, trial running, trial operations, and passenger service, and activities that have an interface with operational readiness

12.3.9 Agenda

A typical agenda will include:

- Reviews of programme activities relating to readiness of Stage 3 Handover, Trial Running, Trial Operations and Passenger Service, and progress to date based on the RAG status of their organisation's, or the group's, trackers;
- Consideration of any risks or issues, which could impact delivery of readiness for Stage 3 of the Elizabeth line introduction;
- Any specific mobilisation requirements relating to MTR-C, LUL, RFLI, or Network Rail
- Agreement on actions going forward;

12.3.10 Outputs

- Each meeting will be recorded with agreed actions assigned and reviewed at the following meeting until completed.
- Minutes of meetings will be circulated to group members and to others as deemed necessary by the Chair.
- Escalation of unresolved but critical actions to PDB, via All Stages ORPI, with a timescale for resolution.

12.3.11 Governance and Authority

- The group will report progress via the All Stages ORPI to the Programme Delivery Board (PDB).
- Members of the group will be assigned by the Chair to liaise with relevant individuals and groups for resolution of issues. These terms of reference may be changed and developed going forward as the project progresses to accommodate additional readiness related tasks.

12.4 Stage 4 Operational Readiness and Programme Integration Group

12.4.1 Purpose

The purpose of the Stage 4 Operational Readiness and Programme Integration (ORPI) Group is to review all aspects of readiness for Stage 4 to ensure the Elizabeth line is ready for the timetable change in May 2019, which incorporates Elizabeth Line services through running from Shenfield to Paddington.

12.4.2 Objectives

The objectives of the Stage 4 ORPI Group are as follows:

1. To ensure complete understanding exists between stakeholders as to the requirements for readiness and to ensure successful delivery of Stage 4.
2. To provide a focus point for operational activities/dependencies relating to the infrastructure deliverables related to Stage 4 implementation.
3. To monitor readiness of the Liverpool St. (high-level) platform extension activities notwithstanding it's a Stage 5 deliverable, as many of the stakeholders are the same for Stage 4.
4. To ensure lessons learned from previous Stages are incorporated into the Stage 4 readiness and testing programme, and also incorporated into the future operations of the Elizabeth line

12.4.3 Chair

Chair: Operational Readiness Team Stage 4 Lead ███████

Deputy Chair: Stage 4 Programme Integration Manager ███████

12.4.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
RfLI	Operational Readiness Team Stage 4 Lead	████████
CRL	Crossrail Programme Integration Team	████████
RfLI	Deputy Operations Director	███████
RfLI	RfL Rolling Stock	███████████████
CRL	Crossrail Programme Risk	███████
NR	Network Rail Crossrail Infrastructure Projects	█████
NR	Network Rail Route Operations	██████
NR	Network Rail Greater Anglia	███
CRL	Crossrail Surface Team	█████████████
CRL	Crossrail Regulatory Approvals	██████
RfL	MTR C Operational Mobilisation	████████
MTR	Testing and Commissioning and Handover Manager	███████
By Invitation – others who have an interest in the readiness programme are invited to attend as required or whose activities will directly affect the testing, integration and readiness programme.		

12.4.5 Secretariat

The secretariat for this meeting is provided through the Operational Readiness Team Stage 4 Lead ████ ██████

12.4.6 Quorum

Either the Operational Readiness Team Stage 4 Lead, or Stage 4 Programme Integration Manager Is required. The group will have authority to make decisions within the bounds of compliance with the requirements and standards of the core members attending from their respective organisations.

12.4.7 Frequency

Meetings of the S4 ORPI Group will be held every **4 weeks**

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12.4.8 Inputs

- Stage 1 residual issues tracker
- Programme activities relating to readiness for the Stage 4 timetable change in May 2019

12.4.9 Agenda

A typical agenda will include:

- Monitoring of readiness activities related to Stage 1 residuals, until closed-out.
- Reviews of programme activities relating to readiness for the Stage 4 timetable change in May 2019, and progress to date based on the RAG status of their organisation's, or the group's, trackers;
- Consideration of any risks or issues, which could impact delivery of readiness for Stage 4 of the Elizabeth line introduction;
- Any specific mobilisation requirements relating to MTR-C, RFLI, Greater Anglia or Network Rail;
- Agreement on actions going forward

12.4.10 Outputs

- Each meeting will be recorded with agreed actions assigned and reviewed at the following meeting until completed.
- Minutes of meetings will be circulated to group members and to others as deemed necessary by the Chair.
- Escalation of items for consideration at Crossrail PDB, via All Stages ORPI, with a timescale for resolution, will be agreed as required.

12.4.11 Governance and Authority

- The group will report progress via the All Stages ORPI to the Programme Delivery Board (PDB).
- Members of the group will be assigned by the Chair to liaise with relevant individuals and groups for resolution of issues.
- These terms of reference may be changed and developed going forward as the project progresses to accommodate additional testing related tasks.

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12.5 Crossrail Information Management Strategy Board

12.5.1 Purpose

The purpose of Crossrail Information Management Strategy Board is to manage all projects within the Rail for London Crossrail Systems and Information Programme (RCSIP), any business change activity inside of RCSIP and any other projects delivered by TfL for Crossrail/RfLI accepted by the Strategy Board that support implementation of the Crossrail / RfL Technology and Data Delivery Portfolio.

12.5.2 Objectives

The Crossrail Information Management Strategy Board will:

- Ensure alignment of delivery portfolio goals with the wider RfL(I) Crossrail operational and organisational strategy and direction;
- Provide advice and guidance on senior business engagement;
- Champion any changes required to support the RfL(I) Crossrail Target Operating Model;
- Assist with resolving or mitigating strategic level delivery portfolio issues and risks;
- Approve delivery portfolio change requests where they potentially impact wider TfL or RfL Crossrail strategy and operations;
- Use influence and authority to assist the delivery portfolio in achieving its objectives;
- Ensures the overall RfL business outcomes and benefits as defined in the agreed business case are realised through the Business Change Authority;
- Make decisions around the prioritisation of programmes and projects within the delivery portfolio;
- Assure that stakeholders are engaged and consulted with;
- Be responsible for monitoring the progress of the Crossrail Information Management (IM) Delivery Portfolio Board, ensuring that it is following the associated TfL pathway gateway governance and is on course to deliver the agreed Business Case, including programme and cost, and if not to take necessary action.

12.5.3 Chair

Chair: Operations Director ▮▮▮▮▮▮▮▮

Deputy Chair: Deputy Operations Director ▮▮▮▮▮▮

12.5.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
RfLI	Delivery Portfolio Sponsor	▮▮▮▮▮▮
RfLI	Crossrail Operations Business Manager	▮▮▮▮▮▮
RfLI	Deputy Operations Director	▮▮▮▮
RfLI	Head of Engineering	▮▮▮▮▮
TfL	CTO & Director of Customer Experience	▮▮▮▮▮
TfL	Head of Transformation Portfolio	▮▮▮▮▮▮▮
TfL	Technology & Data Programme Manager	▮▮▮▮
CRL	Crossrail Technical Director	▮▮▮▮▮
RfL	RCSIP PMO Manager	▮▮▮▮▮
TfL	Lead Sponsor – Networks	▮▮▮▮
RfL	Head of Infrastructure Crossrail	▮▮▮▮
By Invitation - the membership of the group will alter to include representation from other interfacing parties as the project progresses.		

12.5.5 Secretariat

The secretariat for this meeting is provided by ▮▮▮▮▮▮▮ (RCSIP PMO Manager).

12.5.6 Quorum

A majority view of a minimum quorum of 5 members is required for decisions to be binding, with representation from both RfL and TfL Technology & Data. Where this is not possible any recommendations will be circulated to core members for review and agreement.

12.5.7 Frequency

Meetings of the Crossrail Information Management Strategy Board will be held every **4 weeks**, or as decided by the Board Chair.

12.5.8 Inputs

The following will be inputs into and delivered by the Crossrail Information Management Strategy Board:

- Programme performance review, with status of issues and current risk positions
- Strategic context of the programme, and matters arising

12.5.9 Agenda

The Crossrail Information Management Strategy Board will typically discuss the following with a view to successfully delivery of the Portfolio activities to agreed milestones and budget:

- Matters relating to strategic direction;
- Governance decisions;
- Actions to mitigate or resolve risks;

12.5.10 Outputs

- Minutes will be taken during each meeting;
- Minutes, actions and decisions will be circulated within one week of each meeting.

12.5.11 Governance and Authority

- Chair (RfL(I) Operations Director) is responsible for validation and approval of overall budget.
- The threshold for Strategy Board approval is anything above the combined Crossrail and LUB budget of £3.98m and £12.6m (total £16.58m) or impacting a project or Programme outside of the RCSIP Programme remit.

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12.6 Timetable and Performance Group

12.6.1 Purpose

To purpose of the timetable and performance group is to review the development of the Crossrail timetable and review any performance issues.

12.6.2 Objectives

The objectives of the Timetable and Performance Group are to:

1) Develop and review timetable specifications, including proposals for enhanced levels of service
2) Address issues related to the provision of rolling stock and drivers to resource the Crossrail timetable
3) Integrate the Crossrail Central Section timetable with requirements for access for maintenance and with the Rolling Stock maintenance plans
4) Review and signoff timetable specifications prepared by the C-TOC (MTR)
5) Support the development of, and review, Train Plans developed for Dynamic Testing, Trial Running and Trial Operations.
6) Monitor the management of the Crossrail Track Access Option
7) Review impact of Network Rail Maintenance Strategies on delivery of the Crossrail timetable and resource plans
8) Assess the impact of proposed and potential On Network infrastructure changes on the achievement of Crossrail performance targets
9) Review progress in establishing the Crossrail Performance Regime
10) Monitor performance achieved by CTOC
11) Consider any changes being progressed by CRL through its change control process that may impact on the delivery of the Crossrail timetable and comment upon them as necessary.
12) Review resources to support the above activities during the development and delivery of Crossrail AND during its operational stages as to their adequacy and/or opportunities for savings.

12.6.3 Chair

Chair: Operations Director ▮▮▮▮▮▮

Deputy Chair: Performance and Strategy Manager ▮▮▮▮▮▮

12.6.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Crossrail	Operations Director	▮▮▮▮▮
Crossrail	Operations Business Manager	▮▮▮▮▮
Crossrail	Crossrail Concession Manager	▮▮▮▮▮▮
RfL	Head of Maintenance and RAM	▮▮▮▮
RfL	Deputy Director Operations	▮▮▮▮
Crossrail	Operations	▮▮▮▮▮
RfL	Deputy Director (Rolling Stock/Depot)	▮▮▮▮
RfL	Service Delivery Manager Crossrail - RfL	▮▮▮▮▮
RfL	Performance and Strategy Manager	▮▮▮▮▮
Crossrail	Surface Director	▮▮▮▮
RfL	Head of Operations & Readiness	▮▮▮
By Invitation - other members of the Crossrail Operations team are invited to attend as required		

12.6.5 Secretariat

The secretariat for this meeting is provided by the Head of Operations & Readiness - ▮▮▮▮ .

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12.6.6 Quorum

There is no established quorate.

12.6.7 Frequency

Meetings of the Timetable and Performance Group will be held every **4 weeks,** or at such intervals as the Chair may determine.

12.6.8 Inputs

- Receive updates on meetings held with Network Rail, DfT and other Train Operators in regard to Timetabling and Performance issues affecting the Crossrail route. E.g NR Maintenance Strategies and proposed ONW changes
- Crossrail performance regime
- MTR (CTOC) performance
- Other changes that could affect timetable

12.6.9 Agenda

The Agenda for the Timetable and Performance Group will be led by the Operations Director. It may include:

1. Timetable review
2. Rolling stock/driver resource
3. Timetable integration with maintenance
4. Train plans for testing, trial running and trial operations
5. Crossrail Track Option
6. MTR[C] CTOC performance
7. Any changes by CRL
8. Any NR ONW changes
9. Progress with CRL performance regime
10. Resource adequacy/opportunities

12.6.10 Outputs

Outputs will be taken away as actions by the attendees. Minutes will be kept by the Operations Planning Manager.

12.6.11 Governance and Authority

- The Timetable and Performance Group meets with the authority of the Operations Director
- Decisions from this Group will be reported in the Operations periodic report.
- Outputs from this group will inform Operational Readiness Steering Group assessments

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12.7 Performance Steering Group

12.7.1 Purpose

To purpose of the Performance Steering Group is to monitor compliance and co-ordinate activities in relation to the end to end performance of the Elizabeth Line network.

12.7.2 Objectives

The Elizabeth Line Performance Steering Group shall manage the co-ordination, responsibilities, requirements and timescales for performance modelling and improvement across the Elizabeth Line to:

1. Define the Elizabeth Line operational performance strategy.

2. Ensure that assumptions and inputs to performance models are co-ordinated, consistent, and configured appropriately.

3. Act as the key locus for Elizabeth Line performance activities including distribution of modelling reports and outputs from other organisations (eg Network Rail).

4. Validate the requirements and recommendations contained in the 'Recommendations for the Crossrail Performance and Management Regime' document and relevant clauses of the Crossrail Project Functional Requirements have been discharged by the project.

5. Convene sub-groups to address specific issues at a detailed level as required.

6. Review and assess the performance implication of proposed changes (either design or operational) as directed. Where further analysis is required, the panel shall propose an appropriate method of evaluation, e.g. modelling, study etc.

12.7.3 Chair

Chair: Performance and Strategy Manager)

Deputy Chair: Members present may elect a Chair for the meeting from amongst themselves

12.7.4 Membership

Standing Membership		
Organisation	Title	Name
RfL	Performance and Strategy Manager	█████████
Crossrail Ltd.	Head of O&M Interface	█████████
Crossrail Ltd.	Principal Engineer, Rolling Stock and Depots	██████
Crossrail Ltd.	Operations Project Interface Manager	███████
MTR-C	Head of Performance and Planning	██████████
P-Rep	Project Representative	█████
RfL	Maintenance Performance and Reliability Manager	████████
RfL	Operations Modelling Manager	███████
RfL	Performance Manager	█████
RfL	Reliability, Availability and Maintainability Manager	███████
RfL	Service Delivery Manager	████████
By Invitation		
Network Rail	Systems Modelling Specialist	██████
Crossrail Ltd.	C620	█████████████████ ██████
Various	Specialist Contractors/ Advisors	██████

12.7.5 Secretariat

The secretariat for this meeting is provided through the Operations Modelling Manager ████████ ████████

12.7.6 Quorum

There is no established quorate number. Nominated deputies shall be provided where a Standing Member is unable to attend.

12.7.7 Frequency

Meetings will be held on a **four weekly** basis. Additional meetings of the Performance Steering Group may be called as required by the Chair.

12.7.8 Inputs

- Crossrail Programme Functional Requirements
- Recommendations for the Crossrail Performance and Management Regime
- Crossrail Track Access Option

12.7.9 Agenda

The meeting agenda will be varied according to business priorities and current activities in general covering the following key elements:

- Review of actions relating to 'Recommendations for the Crossrail Performance and Management Regime' (30 minutes)
- Review of Crossrail Model Inputs including timetable, infrastructure RAM, rolling stock and model configuration (30 minutes)
- Review of current operational performance issues (15 mins)
- Review of relevant Significant Performance Incidents in the period (15 mins)
- Actions review (15 mins)

12.7.10 Outputs

Outputs will be taken away as actions by the attendees. The Performance Steering Group shall:

- Generate and document integrated and coordinated evidence that Sponsors Requirements have been met with respect to the Crossrail Performance and Management Regime
- Sponsor and publish the Elizabeth Line performance strategy, that shall include:
  - A modelling matrix which reflects the modelling tools used by Crossrail, demonstrating how the aggregated results are combined to realise a holistic performance output. E.g. TRAIL, RailSys, Vision, OSLO, Legion, RAM and other 'system' specific models
  - Outline the relevant accountabilities and responsibilities across client, delivery partners, contractors, operators and stakeholder teams.
  - Outline the timetable for all relevant anticipated modelling workstreams, reflecting the relevant dependencies between model runs.
- Procure and deploy performance models as required by the strategy (e.g. TRAIL).
- Provide formal performance impact assessment in support of Crossrail change control upon request

12.7.11 Governance and Authority

- Modelling is used both to aid the specification and then to help verify and validate the railway as a complete system.
- Ultimately, this Performance Steering Group will provide the governance structure to manage and co-ordinate performance related activities so that the Elizabeth Line will perform to the levels defined in the Sponsor Requirements.
- The responsibility for demonstrating overall Elizabeth Line end to end performance to the Crossrail Sponsors lies fully with CRL.
- This responsibility can only be discharged with input from other areas of Crossrail including Network Rail, MTR Crossrail Ltd, Transport for London (including London Underground Ltd.) and Rail for London teams).
- The Performance Steering Group shall report periodically to the Operations Directorate Timetable and Performance Group.

12.8 RfLI and CRL Training Steering Group

12.8.1 Purpose

The purpose of the RfLI & CRL Training Steering Group is to ensure co-ordination, alignment and appropriate consistency at a working level relating to the training of RfLI staff to maintain and operate the Elizabeth Line.

12.8.2 Objectives

The objective of the RfLI & CRL Training Steering Group is to ensure clarity and timeliness of decision making, and an appropriate level of senior level focus to drive the training programme forward, through a cross functional, representative group of managers. It will:

a) Develop an overall, co-ordinated training plan with clear deliverables.
b) Ensure recommendations reflect, and are representative of the end user.
c) Advise in respect of decisions to be taken affecting project scope, direction, governance and risk management, so that objectives can be achieved in the most effective, economical and timely manner.
d) Assist the project leads in ensuring effective management of interfaces.

12.8.3 Chair

Chair: Head of Infrastructure - Crossrail ▇▇▇▇▇▇

Deputy Chair: Head of Training and Competency Manager ▇▇▇▇▇

12.8.4 Membership

Standing Membership - 'Project Leads' will constitute the standing membership who will have the responsibility for implementing the agreed scope of the project within their respective functional areas

Organisation	Title	Name
RfL	Head of Infrastructure - Crossrail	▇▇▇▇▇
RfL	Operations Training and Competency Manager	▇▇▇▇▇
CRL	Operational Readiness Training Delivery Manager	▇▇▇▇▇
CRL	C660 – Comms & Control Project Manager	▇▇▇▇▇
CRL	C620 – Signalling Project Manager	▇▇▇▇
CRL	C610/C641 – Track/Traction Power PM	▇▇▇▇
CRL	Control Centres and Integration PM	▇▇▇▇▇▇
CRL	Operations Manager (Stations) Delivery	▇▇▇▇▇

By Invitation - if nominated attendees are unable to attend, then an empowered substitute may attend in their place. Additional attendees may be invited as appropriate when particular issues are under consideration and need to report on progress or answer questions.

12.8.5 Secretariat

The secretariat for this meeting is provided through the Head of Training and Competency Manager

▇▇▇▇▇▇

12.8.6 Quorum

There is no established quorate number. Nominated deputies shall be provided where a Standing Member is unable to attend.

12.8.7 Frequency

Meetings will be held on a **four weekly** basis. During critical periods, the meeting may be held more frequently.

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12.8.8 Inputs

- Project progress, change, risk and issues on the delivery of training from the Project Leads

12.8.9 Agenda

The agenda and any formal papers or presentations requiring a decision will be circulated a minimum of 48 hours in advance. Meetings should normally last no more than one hour, and may include a review of:

- Project progress, change, risk and issues on training.
- Risks affecting training, together with mitigation actions identified, owned and progressed.
- Draft training plans and input to design of training solutions; gathering views, where applicable, from other business areas may be necessary to ensure solutions are fit for purpose.
- Interfaces with other programmes, to identify risks and synergy opportunities.
- Lessons learnt and best practice.

12.8.10 Outputs

- Outputs will be taken away as actions by the attendees, and there will be effective and timely communications and engagement with relevant stakeholders.
- The RfLI & CRL Training Steering Group shall ensures training issues are identified and addressed, including escalating them as required for action, decision, endorsement and/or note to the CRL-RfL Interface Steering Board.

12.8.11 Governance and Authority

- This is a working level meeting. Each project lead will be responsible for updating and informing their Line Manager and accountable Director within either the RfL or CRL senior management team.

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12.9 Crossrail Rules Delivery Group

12.9.1 Purpose

To purpose of the Crossrail Rules Delivery Group (CRDG) to lead the development and delivery of the Crossrail Central Operating Section (COS) rule book and GE/RT8000 national rule book changes to support the safe operation and maintenance of the Central Operating Section (COS)

12.9.2 Objectives

The scope of the CRDG is the running lines and associated infrastructure forming the COS of Crossrail and for which Rail for London (RfL) will be the Infrastructure Manager, including arrangements for safe operation and maintenance at signalling and infrastructure interfaces.

The CRDG will review and utilise the following materials to develop proposals for the rule book:

- Railway Group Standard GE/RT 8000 (The Rule Book) and associated publications and forms
- Signalling Operating Principles
- System and sub-system Requirement Technical Specifications
- Designer Operational Safety Rules
- Operational Concepts
- Human Factors Engineering Plans
- Railway Group Standards where these apply
- Outputs from interface working with Network Rail for the Eastern and Western interfaces
- Network Rail and London Underground (LU) Company Standards where these apply
- Operations and Maintenance Manuals as supplied by contractors to the project.
- Other Relevant local documents and instructions.

12.9.3 Chair

Chair: Crossrail Operational Standards Manager ▮▮▮▮▮▮

Deputy Chair: Members present may elect a Chair for the meeting from amongst themselves

12.9.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
RfL	Operational Standards Manager	▮▮▮▮▮
RSSB	RSSB Lead Operations Specialist	▮▮
RSSB	RSSB Operations Specialists	▮▮
RSSB	RSSB Project Manager	▮▮
By Invitation - other members of the Crossrail project teams are invited to attend as appropriate		
Organisation	**Title**	
RfL/NR/ Crossrail/RSSB	RfL Maintenance Planning & Performance Manager; RfL Network Control Manager; MTR - Operations Standards Manager; NR Western Interface – Technical and Operations; NR Eastern Interface – Technical and Operations; RSSB Ergonomics Specialist; RSSB Safety & Assurance Specialist; Rolling Stock Provider; RfL Training & Competence Manager; Subject Matter RfL Asset Engineer; Subject Matter Crossrail Project Technical Discipline	As requested by the CRDG

12.9.5 Secretariat

The secretariat for this meeting will be supplied by the Rail Safety & Standards Board (RSSB).

12.9.6 Quorum

Quoracy will be driven by subject matter but the minimum number of attendees is four.

12.9.7 Frequency

Meetings will occur on a **four weekly** cycle, increasing or decreasing in frequency as required by the workload and project delivery timescales and requirements.

12.9.8 Inputs

The CDRG will consider the following when fulfilling its purpose:

- Operational requirements
- Rule change process timescales
- Crossrail project delivery timescales
- Impact on other publications and parent documents
- Training development needs

12.9.9 Agenda

- The Agenda for the CRDG will be led by the Operational Standards Manager
- CRDG will review proposals for rules and refine them through the agreed process of partial, substantial and ready for validation stages using a range of techniques
- CRDG will ensure developed materials are accurate, complete and meet stakeholders' needs whilst remaining compliant with the operational requirements.

12.9.10 Outputs

- The Secretary will maintain a record of the meetings to demonstrate work undertaken and processes used in decision making
- Issues and risks identified as part of the work undertaken that cannot be resolved by the CRDG will be escalated to the RfL IM Group

12.9.11 Governance and Authority

- The CRDG will provide initial endorsement of developed proposals. If required, a Steering Group may be established to review matters unable to be resolved at the CRDG.
- Developed materials will be subject to examination at the Systems Integration Review Panel (SIRP) to ensure that developed rules are consistent with detailed design and concepts and principles for Crossrail which detail the programme functional requirements.
- Following the SIRP process proposals will be submitted to the Rail for London (RfL) Assurance Board for Crossrail (RABfC)) to be noted for the purposes of safety validation.
- Changes to the National Rule Book will be submitted through the conventional national process.
- Materials identified as leading to requirements for local instructions or training materials/ user procedures will be assigned to the relevant functional lead for further development.
- A presence will be established with the Western European Train Control System (ETCS) Rules Development Group to monitor progress of other IM arrangements governing signalling and maintenance and to represent Crossrail interests when interface arrangements are proposed.
- A presence will be established on the Future Rules Review Group (FRRG) to progress Crossrail proposals for interface arrangements through the national approval process.
- Project management will be undertaken by the RSSB who will align these activities, including reporting, risk management and other relevant arrangements with Crossrail requirements and timescales, overseen by the Chair of the group.

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12.10 Bombardier Contract Review

12.10.1   Purpose

The purpose of the Bombardier Contract Review meeting is to review the performance of the Service Provider (SP) – Bombardier - against the Rolling Stock and Depot Service Provision Agreement (RSPA).

12.10.2   Objective

The objectives of the meeting are to:

- Review the SP's Project Progress Reports representing the SP's view of actual and forecast progress against its obligations under the RSPA;
- Allow both Parties to raise significant concerns in relation to the successful delivery of the RSPA and to resolve these or agree next steps for resolution;
- Provide for the escalation of significant issues for resolution that have not been agreed at meetings between the respective project or fleet managers at a working level;
- Monitor the ongoing progress of significant issues requiring regular senior management attention.

12.10.3   Chair

Chair: RfL Contract Manager in RSPA ▮▮▮▮▮▮▮

Deputy Chair: RfL RSD Contract Manager ▮▮▮▮▮▮▮

12.10.4   Membership

Standing Membership		
Organisation	**Title**	**Name**
RfL	RfL Contract Manager in RSPA	▮▮▮▮▮
RfL/Crossrail	Transition Planning Manager	▮▮▮▮▮
RfL	RfL RSD Contracts Manager	▮▮▮▮▮
RfL	Senior Project Manager – Trains	▮▮▮▮▮
RfL	Senior Project Manager – Depot	▮▮▮▮▮
RfL	Senior Fleet Manager	▮▮▮▮▮
RfL	RSD Principal Engineer	▮▮▮▮▮
RfL	RSD Quality Manager	▮▮▮▮▮
RfL	Assistant Project Manager – Depot	▮▮▮▮▮
BT	Bombardier Contract Manager	▮▮
P-Rep	Project Representative	▮▮▮▮▮
Invitation – other employees or agents of the Service Provider (SP), or their contractors/subcontractors, and the same for RfL and rfL, may be invited as required		

12.10.5   Secretariat - is provided through the Business Support Manager – ▮▮▮▮▮▮▮ .

12.10.6   Quorum - there is no established quorate.

12.10.7   Frequency - meetings will be held every **four weeks**, or as advised by RfL.

12.10.8   Inputs

- Inputs will be driven by the Project Programme and SP Project Progress Reports against the same, against which performance can be assessed and issues identified
- RfL will issue the agenda by no later than ten calendar days in advance of the next Meeting.
- RfL shall consider any items proposed by the SP for inclusion in the agenda. If the SP has any items for inclusion on the agenda these are to be provided to RfL by the SP formally in writing by no later than 5 calendar days in advance of the Meeting.
- In the event the agenda is amended for whatever reason, RfL shall issue a revised agenda by no later than 2 working days in advance of the Meeting.

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- The agenda shall include time for the various areas of the RSPA to be reviewed and include sufficient time to allow the Parties to review the minutes of the previous Meetings.

12.10.9 Agenda

The Bombardier Contract Review meeting shall achieve its purpose through:

- High level reviews of the SP's Project Progress Reports with any significant deviations against the Project Programme being brought to RfL's attention with reasons for such variance presented by the SP (reporting by exception);
- Questions and answers on the SP's Project Progress Reports in relation to the SP's performance generally;
- Focused and concise discussion on significant issues raised by either Party within the SP Project Progress Reports or at the Meeting, and;
- Reviews of minutes of previous meetings to ensure these are being actioned and closed out in a timely manner.

12.10.10 Outputs

- The meeting minutes shall be a concise record of the meeting and include any actions.
- Actions shall include a description of the action, the person responsible for completing the action and a date by which each action will be completed;
- Actions shall be acted upon by the person on whom that action is allocated as soon as possible following the conclusion of the meeting, subject to the date of completion agreed at the meeting;
- The minutes shall be produced and circulated to the SP by RfL promptly after the Meeting has concluded and in any event by no later than a week from the date of the Meeting.
- In the event this is delayed, RfL shall issue a communication to the SP to this effect and provide a revised date for issue which shall not exceed two weeks from the date of the Meeting.
- The SP shall respond with any queries or proposed amendments to the minutes within a week following issue of the minutes by RfL. Such queries must be of sufficient detail to allow the minutes to be amended if required, high level statements that do not permit this shall not be included within the minutes.
- In the event there are no comments received from the SP within a week of issue of the minutes by RfL, the Parties agree that the minutes as issued are an accurate record of the Meeting.

12.10.11 Governance and Authority

- Lower level matters arising requiring action will be devolved to local working level meetings where possible

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12.11 Stage 3 Stations Operational Readiness Group

12.11.1 Purpose

The purpose of the Stage 3 Stations Operational Readiness Sub-Group is to identify and review the relevant activities that demonstrate progress related to testing and operational readiness for the Central Operating (COS) Section stations.

12.11.2 Objectives

The purpose of the Stage 3 Stations Operational Readiness Sub-Group is to provide assurance, through the Stage 3 Elizabeth Line Readiness Steering Group, that stations for Stage 3 Elizabeth Line services will be operationally ready for service commencement, as per the Crossrail staged opening plan, and that they will provide a level of customer experience that meets the expectations of all key stakeholders and future customers.

12.11.3 Chair

Chair: Operational Readiness Manager ▇▇▇▇▇▇▇▇

Deputy Chair: Head of Operations & Readiness   ▇▇▇▇▇

12.11.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
RfLI	Operational Readiness Manager	▇▇▇▇▇▇
RfLI	Head of Operations & Readiness	▇▇▇▇
RfLI	RfL Maintenance	▇▇▇▇
RfLI	RfL Engineering	▇▇▇▇▇
CRL	Testing and Commissioning Strategy Manager	▇▇▇▇▇
CRL	Testing and Commissioning Manager	▇▇▇▇▇▇
MTR	Stage 3 Delivery Manager	▇▇▇▇▇▇▇▇
LU	Head of LU Crossrail Team	▇▇▇▇
By Invitation - others who have an interest in the stations readiness programme are invited to attend as required, or whose activities will directly affect the testing, integration and readiness programme.		

12.11.5 Secretariat

The secretariat for this meeting is provided through the Operational Readiness Manager ▇▇▇▇▇▇

12.11.6 Quorum

A Chair is required from the RfL Operational Readiness team for the meeting to be quorate. The group will have authority to make decisions within the bounds of compliance with the requirements and standards of the core members attending from their respective organisations.

12.11.7 Frequency

Meetings of the Stage 3 Stations Operational Readiness Sub-Group will be held at intervals no greater than every **4 weeks**, unless otherwise agreed.

12.11.8 Inputs

- Stations delivery and operations programmes, including progress updates, to the level of detail required to track operational readiness at a station level;
- RAB(C) deliverables
- Maintenance and Operations requirements for RfL/MTR and LU for both testing, and operational readiness
- Resourcing plans

12.11.9   Agenda

A typical agenda may include:

- Reviews of the current station delivery and operations programme(s) relating to readiness, and progress to date, including updates (by exception) based on RAG status;
- Consideration of any special instructions relating to the testing programme;
- Relevant updates / briefings of outputs from RAB(C) where relevant to station operational readiness;
- Any specific MTR-C and London Underground requirements relating to station testing and the provision of station staff;
- Maintenance requirements relating to station readiness;
- London Underground requirements for testing stations where it is the Stations Facility Operator (SFO);
- Resourcing plans for the testing period through to Handover;
- Agreement on actions going forward;

12.11.10   Outputs

- Each meeting will be recorded with agreed actions assigned and reviewed at the following meeting until recorded as closed.
- Minutes of meetings, and updated trackers, will be circulated to group members, and to others as deemed necessary by the Chair
- Escalation of unresolved but critical actions to the Stage 3 Elizabeth Line Readiness Steering Group with a timescale for resolution.

12.11.11   Governance and Authority

- Governance will conform to the Operations Director's current organisational structure and governance model as set out in the Operations Management Plan;
- The group will not be directly responsible for managing any activity planned for the period prior to commencement of dynamic testing.
- Members of the group will be assigned by the Chair to liaise with relevant individuals for resolution of issues;
- The group will report progress via the Stage 3 Elizabeth Line Readiness Steering Group;
- As necessary, and by exception, activities requiring escalation will be reported at Stage 3 Elizabeth Line Readiness Steering Group.
- If items require further escalation they will follow the governance process as defined in the Crossrail Operations - Operational Readiness Strategy
- Where further escalation is necessary, specifically for delivery of COS stations, as agreed by the Stage 3 Elizabeth Line Readiness Steering Group, items will be raised as necessary to the Crossrail Programme Delivery Board (PDB).

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12.12 Duty Holders' Hazard Review Panel

12.12.1   Purpose

The purpose of the Duty Holders' Hazard Review Panel (Duty Holder-HRP) is to allow the controlled allocation of hazards and hazard mitigations at the boundaries between Infrastructure Manager, and Railways Undertakings, facilitating thus demonstration that the various Duty Holders' Safety Management Systems are integrated and hence the end-to end railway is safe

12.12.2   Objectives

The main objective of the Duty Holders' Hazard Review Panel are the allocation of hazards and mitigations at Central Operating Section boundaries involving RfL, LU, NR and MTR Crossrail. The panel will concern itself only with operational (including maintenance) hazards already transferred out of the engineering domain.

12.12.3   Chair

Chair: Head of Regulatory Approvals (

12.12.4   Membership

Standing Membership		
Organisation	**Title**	**Name**
RfL/RFLI	Chair*	
RfL/RFLI	Deputy Chair*	
RfL/RFLI	Recorder*	
RfL/RFLI	RFLI IM Representative(s)	Representatives will only attend when it is proposed to transfer a risk control action to them
LU	LU IM Representative(s)	
NR	NR IM Representative(s)	
MTRC	MTRC RU Representative(s)	
*In this forum, the three starred panel members are working on behalf of RfL and are therefore not representing Crossrail		

12.12.5   Secretariat

The Recorder will convene meetings, and prepare the minutes of all meetings and monitor the close out of action items.

12.12.6   Quorum

The presence of either the Chair or Deputy Chair is required, and representatives from the required disciplines for the risk control actions. A meeting can not go ahead if the representative present is not competent and has not been given the authority to accept the risk control action on behalf of their organisation

12.12.7   Frequency

The panel will be convened on an as and when required basis to review items submitted by any Duty Holder

12.12.8   Inputs

The Duty Holders' HRP will receive:

- Extract of Duty Holders' Safety Issue File (SIF) with the proposed items
- Any other supplementary information relevant to understand the risk control action and the original hazard

12.12.9   Agenda

- Acceptance of previous meeting minutes

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- Review risk control actions raised

Specific agenda items will be determined and notified prior to each meeting as relevant.

12.12.10 Outputs

- Meeting minute pack including minutes, sign in sheet and a cut of the Duty Holders' Safety Issue File (SIF) which will identify whether the issue has been Closed/placed On-Hold/Rejected (back to Crossrail)

12.12.11 Governance and Authority

- The Duty Holders' HRP shall report to the Railway Assurance Board (Crossrail) when necessary
- In addition, the HRP shall report to the Technical Authority Group where a technical impact is identified, as required
- The HRP does not have change authority; however, its members are able to make recommendations on mitigations for hazards that can then subsequently inform the change process

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12.13 Other Operations Directorate Meetings

In addition to the documented terms of reference described within this chapter, the following forums regularly meet to govern activities relating to the Crossrail Operations Directorate, Rail for London and its relationship with Transport for London.

These forums include:

- TfL Rail & Underground Panel
- RfL Crossrail Programme Board
- Operations Director's Periodic Review
- Project Controls: Change and Approvals Review
- CTOC (MTR) Management Review
- Trial Operations Delivery Steering Group
- Surface Stations Upgrade Group
- Handover Steering Group
- Commercial Steering Group
- Old Oak Common Operations Readiness & Testing

These meetings have not been included within this governance document either because there are no terms of reference currently available, or they were not of direct relevance to understanding Crossrail's programme governance.

The relationships between these meetings and the Crossrail Operations Directorate are illustrated in more detail in Appendices 19.3 – Operations Directorate Governance Model

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13 Railway Assurance Board (Crossrail)

13.1 Overview

The Railway Assurance Board (Crossrail) is unique in that it serves **two** separate purposes in assuring that the Crossrail end-to-end railway is safe:

1. CRL's Safety Review Panel (SRP) – for all Central Operating Section assets
2. RFLI's Infrastructure Manager Safety Review Panel (SRP) – independently assuring that RFLI can accept assets "into use"

The purposes are complimentary with much of the safety assurance reviewed both through (1) as CRL's SRP and through (2) to allow acceptance of the assets by RFLI from the SRP.

In both roles RAB(C) will ensure that interfaces with other duty holders including Network Rail, London Underground, the train operator - MTR, Docklands Light Railway, RFLI as Infrastructure Manager of the East London Railway – Core Route, the London Overground concessionaire (currently LOROL, but shortly to be Arriva Rail London) and RFLI as the procurer of the Class 345 rolling stock for use of the Elizabeth Line have been adequately considered in the design of the infrastructure and the operations and maintenance arrangements.

Where roles (1) and (2) differ is in authorising the railway infrastructure to be brought into use. In this case, RAB(C) is additionally required to review and approve RFLI's demonstration/evidence of Operational Readiness and Maintenance Readiness.

This section of the document provides a high-level view of the terms of reference for both roles carried out by RAB(C). A full terms of reference is available and should be consulted for complete understanding – ref [13] under Section 18 – Reference Documents.

13.2 Purpose of RAB(C) as CRL's Safety Review Panel

13.2.1 Purpose

RAB(C) has accountability as Crossrail's Safety Review Panel (SRP) for the Central Operating Section (COS); this includes the integration of Rolling Stock with the COS but not the Rolling Stock design. It includes Plumstead sidings, but excludes Old Oak Common.

13.2.2 Objectives

The objectives of RAB(C) as Crossrail's SRP are to:

1. Accept the Product Safety Case (PSC) where safety of a product cannot be demonstrated by the application and compliance of a relevant standard or comparison with a reference system
2. Certify the safety of RFLI equipment embedded within an LU station and its interfaces with LU assets (LU will satisfy themselves RAB(C) is competent to assure this on its behalf)
3. Accept top-level Safety Justifications (SJs) which demonstrate that Contractors' Engineering Safety Justifications are integrated with the other assurance evidence (for example, Product Safety Cases) and that an asset (or Element) such as a station, shaft, portal etc. is technically safe to operate and maintain
4. Review hold points – e.g. ready to test, safety plans for dynamic testing and ready to energise – by accepting through an independent safety assessment the CRL proposed Testing and Commissioning activities method and safety measures (e.g. energisation of overhead lines)

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13.2.3 Chair

Chair: Independent Chair, ██████████

13.2.4 Membership

RAB(C) Panel Members			
	Panel Members	**Job Title**	**Name**
Core Panel CRL SRP/RFLI SRP	Chairman	RAB(C) Chair	████████
	RFLI Professional Head of Engineering (CRL IM)	RFLI Head of Engineering Crossrail Infrastructure	████████
	RFLI Professional Head of Maintenance RFLI (CRL IM)	RFLI Head of Infrastructure	████████
	RFLI Professional Head of Operations (CRL IM)	Network Assurance Manager	████████
	RFLI Operations	RFLI Deputy Director Operations	████████
	RFLI Professional Head of Safety	RFLI Head of Safety	████████
	RAB(C) Manager / panel organiser	Safety Assurance Board Manager	████████
	RFLI CRL Systems Safety	RFLI Systems Engineer (CRL)	███
	Independent Safety Expert	Independent Safety Expert	████████
	CTOC	CTOC Representatives	████████████
	CRL Systems Safety	CRL Head of System Safety and Interoperability	██████rkani
	CRL Integration	CRL Head of Integration	████████
	CRL Engineering	CRL Chief Engineer (and discipline lead when appropriate)	████████
	CRL Health & Safety	CRL Director of Health & Safety	████████
	CRL Rolling Stock and Depot	CRL Head of Engineering, RSD	██████
	CRL/RFLI	CRL Acting Head of Regulatory Approvals	████████
Attendance As and When Required	LUCT Engineering	HSE Manager (required when LUL asset is impacted)	████████
	NR Crossrail Rep	Head of Engineering (required when interface safety cases are being reviewed) incl. rolling stock	█████
	CRL/RFLI	CRL Regulatory Engineer	██████
	Technical Experts, Operational Experts, Maintenance Experts	As deemed necessary by Chairman *	As appropriate
	Other Duty Holders	To Be Advised. E.g. DLR, HAL, NR, MTR, LU invited as necessary	TBC
	Observer	P Rep	████████, ████████
	Observer	AsBo	████████, ████████

Figure 7 – RAB(C) Panel Membership

13.2.5 Secretariat

The RAB(C) manager/panel organiser – ██████████ – will provide secretariat services to RAB(C):

13.2.6 Quorum

RAB (C) will require the full presence of those required to review and approve each safety submission. The requirements to be quorate for each or RAB (C)'s roles is as described within the full TOR.

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13.2.7 Frequency

The RAB(C) meetings are normally held on a 2 weekly basis. Special Panel meetings are made available at request and with agreement with the RAB(C) Chair.

13.2.8 Inputs

- RFLI and LU independently reviewed PSCs and ESJs with recommendation regarding acceptance
- Top-level Safety Justifications (including Interim Safety Justifications):
  - Produced by Crossrail's System Safety Team
  - Approved by the Chief Engineer (who holds Technical Authority)
  - Reviewed by the relevant IM who will assess CRL's demonstration of the integrated technical/maintenance/operational safety, and make a recommendation to RAB(C) for acceptance

13.2.9 Agenda

The Agenda of RAB(C) as CRL's SRP will be led by the submissions concerned but will typically:

- Review Product Safety Cases (PSCs) and, where necessary, Engineering Safety Justifications (ESJs) to:
  - Accept and issue an Acceptance Certificate
  - Non-accept and/or appoint independent technical expert to assess safety evidence
  - Assess both the IM and Crossrail positions on PSCs or ESJs, where parties do not agree, and to make an acceptance decision, or to refer for further assurance
- Review of top-level Safety Justifications for acceptance
  - Reviewing the IM recommendation
  - Reviewing CRL rationale if they do not agree with the IM assessment
  - Refer for further independent technical assurance or further safety evidence, if required.

13.2.10 Outputs

- Minutes of meetings, that will include an action tracker for the logging and closure of actions - e.g.
  - Issuance of Acceptance Certificates
  - Appointment of Independent Technical Experts to assess safety evidence
  - Actions to obtain/collate further safety evidence, or review reports
- Minutes of meetings will be produced within ten working days of the RAB (C) meeting and issued for comment.

13.2.11 Governance and Authority

- CRL have established a System Safety Plan (SSP) for the Central Operating Section (COS) which has been accepted by the future Infrastructure Managers (IMs) as a robust process for demonstrating that the delivered assets are safe to be operated and maintained.
- The CRL SSP has adopted the Common Safety Method regulation for Risk Evaluation and Assessment
- The CRL SSP requires the production of a Product Safety Case (PSC) where safety cannot be fully demonstrated by the application and compliance of a relevant standard or comparison with a reference system.
- The PSCs support the Engineering Safety Justifications (ESJs) from CRL's contractors which demonstrate that their scope of supply is technically safe to be operated and maintained.
- CRL have the responsibility to integrate the ESJs with other assurance evidence and to produce the top level Safety Justifications (SJs) which demonstrate that an asset (or Element) such as a station, shaft, portal etc. is technically safe to operate and maintain.

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13.3 Purpose of RAB(C) as RFLI's Safety Review Panel (SRP)

13.3.1 Purpose

RAB(C) has accountability as RFLI's SRP for the Central Operating Section (excluding the LU Stations.) i.e. for the future RFLI infrastructure and its interfaces.

13.3.2 Objectives

The objectives of RAB(C) as RFLI's SRP are to:

1. Certify RFLI have the appropriate organisation and resources, supported by robust process and procedures, so that the infrastructure can be operated and maintained safely and can take corporate responsibility for the safety of the Central Operating Section

13.3.3 Chair

Chair: Independent Chair, ▮▮▮▮▮▮

13.3.4 Membership

	Panel Members	Job Title	Name
	RAB(C) Panel Members		
	Chairman	RAB(C) Chair	▮
	RFLI Professional Head of Engineering (CRL IM)	RFLI Head of Engineering Crossrail Infrastructure	▮
	RFLI Professional Head of Maintenance RFLI (CRL IM)	RFLI Head of Infrastructure	▮
Core Panel CRL SRP/RFLI SRP	RFLI Professional Head of Operations (CRL IM)	Network Assurance Manager	▮
	RFLI Operations	RFLI Deputy Director Operations	▮
	RFLI Professional Head of Safety	RFLI Head of Safety	▮
	RAB(C) Manager / panel organiser	Safety Assurance Board Manager	▮
	RFLI CRL Systems Safety	RFLI Systems Engineer (CRL)	▮
	Independent Safety Expert	Independent Safety Expert	▮
	CTOC	CTOC Representatives	▮, ▮
	CRL Systems Safety	CRL Head of System Safety and Interoperability	▮
	CRL Integration	CRL Head of Integration	▮
	CRL Engineering	CRL Chief Engineer (and discipline lead when appropriate)	▮
	CRL Health & Safety	CRL Director of Health & Safety	▮
	CRL Rolling Stock and Depot	CRI Head of Engineering, RSD	▮
	CRL/RFLI	CRL Acting Head of Regulatory Approvals	▮
Attendance As and When Required	LUCT Engineering	HSE Manager (required when LUL asset is impacted)	▮
	NR Crossrail Rep	Head of Engineering (required when interface safety cases are being reviewed) incl. rolling stock	▮
	CRL/RFLI	CRL Regulatory Engineer	▮
	Technical Experts, Operational Experts, Maintenance Experts	As deemed necessary by Chairman *	As appropriate
	Other Duty Holders	To Be Advised. E.g. DLR, HAL, NR, MTR, LU invited as necessary	▮
	Observer	P Rep	▮, ▮
	Observer	AsBo	▮, ▮

Figure 8 – RAB(C) Panel Membership
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13.3.5 Secretariat

The RAB(C) manager/panel organiser – ██████████ – will provide secretariat services to RAB(C):

13.3.6 Quorum

RAB (C) will require the full presence of those required to review and approve each safety submission. The requirements to be quorate for each or RAB (C)'s roles is as described within the full TOR.

13.3.7 Frequency

The RAB(C) meetings will normally be held on a 2 weekly basis. Special Panel meetings available at request and with agreement with the RAB(C) Chair.

13.3.8 Inputs

- Assured assets handed over by CRL with all supporting evidence and documentation
- TfL Pathway process and Pathway Project Plan of Work (PPWW) to bring new or modified assets into use, together with key documents
- Effective and established RFLI organisation with competent resources and all necessary SMS processes and procedures to demonstrate it can safely operate and maintain infrastructure
- All other RFLI corporate requirements – e.g. ORR approvals of the SMS in line with ROGS

13.3.9 Agenda

The Agenda of RAB(C) as RFLI's SRP will be led by the submissions concerned but will typically:

- Review evidence of 'stress testing' of the Safety Management System (SMS) to assure all the hazards associated with RFLI's scope have been identified and will be managed by the application of appropriate processes and procedures.
- Review evidence of RFLI's Operational Readiness to establish that the Head of Operations has sufficient competent resources, processes and procedures to manage operational safety.
- Review evidence of RFLI's Maintenance Readiness to establish that the Head of Maintenance has sufficient competent resources, processes and procedures to maintain the railway to a minimum safe condition.
- Sufficient documentary evidence at high level of both Proposers' compliance across all aspects of CSM Regulation.

In additional to the above reviews RAB(C) needs to satisfy itself that all other requirements have been met to allow RFLI to take corporate responsibility for the safety of the railway such as:
- Legal and commercial agreements
- ORR issue of a Safety Authorisation subject to SMS being in place.
- Integration with other Duty Holders
- Application of the Common Safety Method (CSM) with respect to Organisational change (supported by signed-off Safety Assessment Report)
- All appropriate tools (including software) and equipment are in place.

13.3.10 Outputs

RAB(C) will only certify that the Central Operating Section can be brought into use when it is satisfied that RFLI is a competent organisation supported by robust processes and procedures. Certification will include that:
- The Handed over infrastructure can be placed into use
- RFLI can take corporate responsibility for the operation and maintenance of the railway
- RFLI can take responsibility for the safety of the infrastructure (RAB(C)) accepting on RFLI's behalf

In order for RAB(C) to accept the corporate responsibility for safety on behalf of RFLI, the panel can request any supporting evidence or request any additional evidence it deems necessary to satisfy itself the COS is safe.

- Minutes of meetings will be produced within ten working days of the RAB (C) meeting and issued for comment.

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13.3.11   Governance and Authority

- For the scope of RFLI's responsibilities as the Central Section Infrastructure Manager, RAB(C) will act as RFLI's SRP with the accountability for certifying that RFLI have the appropriate organisation and resources supported by robust processes and procedures, such that this infrastructure can be operated and maintained safely, in the context of a major change as defined in the Common Safety Method for Risk evaluation and Assessment.
- With regards for the technical safety of the assets this is established by the Panel when acting as CRL's SRP detailed above
- However, for the emerging RFLI IM organisation, it is RFLI's responsibility to demonstrate to the RAB(C) Panel the Operational and Maintenance Readiness of the organisation including any interfaces with other Duty Holders (e.g. Network Rail, London Underground, Crossrail Train Operating Contract (CTOC) etc.).

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13.4 RAB(C) Sub-Groups

13.4.1 Where necessary and agreed by RAB(C), sub-groups may be established to review an agreed sub-set of submissions. Sub-Groups may be proposed by CRL or RFLI for RAB(C) functioning in either of its roles.

The administration, chairing and membership of the sub-group and the submissions that it will review shall be agreed by RAB(C). They cannot be changed without further agreement.

Satisfactory completion of a review by the sub-group shall result in a recommendation to RAB(C) to accept the relevant submission.

The Chair of the sub-group shall report to each RAB(C) meeting any recommendations for acceptance. If RAB(C) accepts the recommendation, the submission shall be considered accepted by RAB(C).

13.4.2 Membership

There are specific memberships for both the RAB(C) Systemwide and Stations Sub-Groups, as illustrated below:
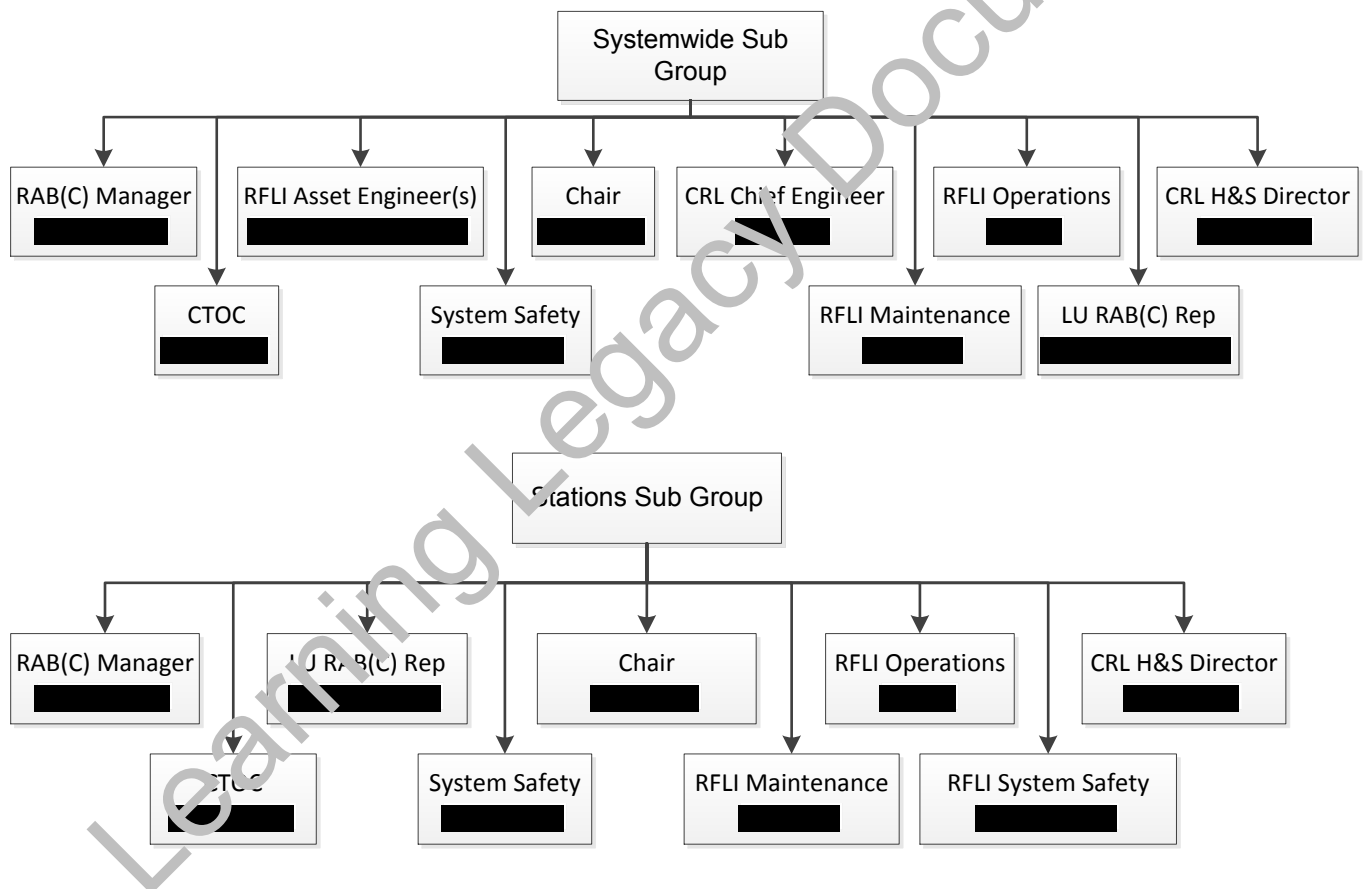
Figure 9 – RAB(C) Sub-Group Panel Memberships

14 Crossrail Operations and Systems Expert Panel

14.1.1 Purpose

The purpose of the Crossrail Operations and Systems Expert Panel is to carry out for CRL, in an advisory capacity only, independent high-level peer reviews of:

- Crossrail's operations and maintenance plans (to enable the end-to-end railway including the Central Section, Network Rail surface sections and the Heathrow infrastructure to be handed over successfully into passenger operations in accordance with Sponsor's Requirements) and;
- The Central Section Rail and Rolling Stock systems designs

14.1.2 Objectives

The objective of the Crossrail Operations and Systems Expert Panel are to:

1. Review the operating and maintenance arrangements in normal and degraded mode and "Bringing into Use" plans to identify any risks and issues which may prevent Crossrail from achieving its objectives for each stage of opening in accordance with the Requirements.
2. Consider systems designs and specifications and how they affect the performance of the railway.
3. Review the eventual chosen design to ensure fitness for purpose and alignment with Operations Requirements and objectives and its impact on project delivery risk.

14.1.3 Chair

Chair: Panel Chairman ████████████

14.1.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Independent	Expert (Chair)*	████████████
Independent	Expert	████████████
Independent	Expert	████████████
Independent	Panel Coordinator	████████████
*The ICE will appoint the Panel Chairman and other core members of the Panel and invite other ad hoc members as required from time to time where agreed with CRL and the Panel Chairman		
By Invitation: At the request of the Panel Chairman, CRL will arrange for appropriate attendance from Network Rail, the Infrastructure Manager (RfL and LU as appropriate), the Crossrail Train Operating Company (CTOC)		

14.1.5 Secretariat - Crossrail will appoint the Panel Coordinator. The Panel Coordinator will convene meetings, and prepare the minutes of all meetings and monitor the close out of action items.

14.1.6 Quorum - there is no established quorate.

14.1.7 Frequency – the core members of the Panel will meet formally **every quarter**.

14.1.8 Inputs

The Operations scope shall include:

- Trial Operations and Day 1 Operations plans
- Performance modelling and timetabling
- Operations Concepts
- Operating procedures and Rule Books
- CTOC procedures, processes and management arrangements
- Maintenance strategy and plans

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The systems scope shall include:

- Rolling Stock
- Signalling and Control system
- Power systems and Overhead Line Equipment (OHLE)
- Ventilation
- Trackform
- PEDS
- Control Centre and Back-up Control Centre

14.1.9 Agenda

The scope of review considered by the panel will include:

- Alignment of the detailed systems and rolling stock designs with operating concepts/procedures and maintenance plans.
- Whether the designs are feasible, constructible, and practical, and that contingency plans are appropriate and robust
- Whether engineering and safety assurance issues for the construction, operational and maintenance phases of the project have been considered as an integral part of the design.

Working meetings of the Panel will also be arranged to consider particular elements of the Works

14.1.10 Outputs

- A quarterly report will be prepared and issued by the Panel Chairman to the CRL Programme Director, for submission to the CRL Board.
- All reports, comments and other communications by the Panel to CRL will be circulated as appropriate within CRL, its consultants and contractors and relevant third parties.

14.1.11 Governance and Authority

- Amendments to these Terms of Reference may be proposed at any time by the ICE, the Panel Chairman, the CRL Director of Operations or the CRL Programme Director.
- Amendments shall be made only if recorded in writing and signed by the ICE, the Panel Chairman, the CRL Director of Operations and the Programme Director.
- Reports issued by the Panel, minutes of the Panel's proceedings and records of comments from Panel members will potentially be public documents, as it is CRL policy to comply with Freedom of Information Act requirements regarding disclosure of documents.
- Furthermore, records of the Panel's proceedings may be relevant in HSE or judicial proceedings to demonstrate that due process has been undertaken.
- The ICE will appoint a representative who will act as primary point of contact in relation to the Panel for both the Panel Chairman and CRL

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15   Future evolution of Governance

This is the final update of Crossrail's programme governance framework prior to the handover of the Central Operating Section, and its transition into trial operations.

Following handover, Crossrail will deliver Stages 4 and 5 in May and December 2019 respectively and complete Crossrail's obligations under the Project Development Agreement. Crossrail's organisation and governance at this stage will ensure that its leadership, decision-making and reporting maintain performance and effectiveness as its functions close or transition into TfL. Any changes to governance will be approved by Excom.

16   Abbreviations

BIU	Bringing Into Use
BUCF	Backup Control Facility
CARE	Crossrail Assurance Reporting Environment
CEC	Chief Engineer's Communication
CEG	Chief Engineer's Group
COS	Central Operating Section
CPFR	Crossrail Programme Functional Requirements
CRL	Crossrail Limited
CSM	Common Safety Method
CTOC	Crossrail Train Operating Company
DIR	Detailed Interface Specification
DLR	Docklands Light Railway
DOO CCTV	Driver Only Operation CCTV
DRACCT	Directors Risk Assurance Change Control Team (LUL)
EMC	Electro-Magnetic Compatibility
ERTMS	European Rail Traffic Management System
ESJ	Engineering Safety Justification
ESM	Engineering Safety Management
ETCS	European Train Control System
FDC	Framework Design Consultant
GSM-R	Global System Mobile communications - Railway
HAL	Heathrow Airport Limited
HAL ARP	Heathrow Airport Limited Assurance Review Panel
HMDL	Handover Master Deliverables List
HEX	Heathrow Express
HRP	Hazard Review Panel
ICD	Interface Control Document
IM	Infrastructure Manager
IMPRG	Infrastructure Manager's Progress Review Group
IRS	Interface Requirement Specification
LO	London Overground
LUL	London Underground Limited
MADL	Master Assurance Deliverables List
MCR	Materials Compliance Record
MIRP	Maintenance Integration Review Panel
MOHS	Master Operational Handover Schedule

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MTR [CRL]	Mass Transit Rail [Crossrail]
NNTR	Notified National Technical Rules
NR	Network Rail
ONFR	On Network Functional Requirements
ONW	On Network Works
ORSG	Operational Readiness Steering Group
ORR	Office of Rail and Road
PDA	Project Delivery Agreement
PDB	Programme Delivery Board
PMI	Project Manager's Instruction
PSC	Product Safety Case
PWHR	Project Wide Hazard Register
RAB(C)	Railway Assurance Board [Crossrail]
RAM(S)	Reliability, Accessibility, Maintainability (and Safety)
RCC	Route Control Centre
RfL	Rail for London
RIA	Railway Integration Authority
RIRP	Railway Integration Review Point
ROGS	Railway and Other Guided Transport Systems
RSD	Rolling Stock and Depot
RSOPB	Railway Systems and Operations Programme Board
S&C	Sustainability & Consents
SIRP	Systems Integration Review Panel
SJ	Safety Justification
SMS	Safety Management System
SRP	Safety Review Panel
SSP	System Safety Plan
STA	Systems Technical Authority
TAG	Technical Authority Group
T&C	Testing & Commissioning
TOC	Train Operating Company
TSI	Technical Standard for Interoperability
VAP	Verification Activity Plan

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17 Reference Documents

Ref:	Document Title	Document Number:
1.	Commercial and Change Sub-Committee - Terms of Reference	CR-XRL-Z6-STP-CR001-50026
2.	Crossrail Limited - Scheme of Authorities	CR-XRL-Z6-GPR-CR001-00003
3.	Crossrail Limited Board Regulations	CR-XRL-Z6-GST-CR001-00012
4.	Crossrail Delivery Strategy	CR-XRL-Z-GST-CR001-00001
5.	Crossrail Project Handover – Strategy and Plan	CRL1-XRL-K1-STP-CR001-50001
6.	Executive and Investment Committee - Terms of Reference	CR-XRL-Z6-GST-CR001-00002
7.	Elizabeth Line Strategic Steering Group	TBC
8.	Handover Delivery Working Group (Central Section) - Terms of Reference	CRL1-XRL-T-RGN-CR001-50304
9.	Hazard Review Panel - Terms of Reference	CRL1-XRL-O8-GPS-CR001-50009
10.	Maintenance Steering Group Terms of Reference	CRL1-XRL-O8-GUI-CR001-50003
11.	Management Plan: Volume 1 - Corporate, Support & Specialist Function Directorates	CR-XRL-O4-GPG-CR001-00001
12.	Programme Delivery Board – Terms of Reference	CR-XRL-Z6-STP-CR001-50032
13.	Railway Assurance Board (Crossrail) - Terms of Reference	CRL1-RFL-O-GPD-CR001-50001
14.	Systems Integration Review Panel (SIRP) - Terms of Reference	CRL1-XRL-O8-GPS-CR001-50016
15.	Systems Safety Steering Group	CRL1-XRL-Z7-GPD-CR001-50031
16.	Technical Authority Group (TAG) - Terms of Reference	CRL1-XRL-Z6-STP-CR001-50003
17.	Testing, Commissioning and Handover Steering Group	CRL1-XRL-Z6-GUI-CR001-50001
18.	Testing and Commissioning Configuration Review Panel	CRL1-XRL-O8-GPS-CRG03-50001

18 Appendices

18.1 Meeting Type Classifications

Crossrail uses standard classifications for its meeting designations:

- A **Board:** exercises executive decision-making with the involvement of project or programme sponsors
- An **Authority:** is a top-level forum that exercises its authority to make recommendations (and, where agreed, decisions) through the delegated authority of the accountable persons present
- A **Steering Group**: is a forum that meets to review issues and risks relating to a clear strategy, and makes recommendations to direct (steer) their resolution
- A **Working Group**: receives, defines and works through problems to solve them or, if not, proposes solutions or options for their resolution

18.2 A typical Crossrail Meeting (ToR format)

18.2.1 Purpose

***One liner – what overarching function is this meeting intended to fill?

18.2.2 Objectives

***Two-four key objectives of business that this meeting intends to discharge

18.2.3 Chair

**Single named individual in charge (plus deputy chair, if applicable)

18.2.4 Membership

Standing Membership		
Organisation	**Title**	**Name**
Network Rail/ Bombardier/MTR/LU/RfL/Crossrail	Head of X	Name
By Invitation		
Organisation	**Title**	**Name**
Network Rail/ Bombardier/MTR/LU/RfL/Crossrail	Head of X	Name

18.2.5 Secretariat

**Named individual responsible for booking rooms, issuing agenda, invites, capturing notes/decisions and issuing minutes

18.2.6 Quorum

**If applicable, minimum number of attendees (including names) required for meeting to be "valid" in making decisions/recommendations

18.2.7 Frequency

*How often does this meeting meet? Weekly, alternate weeks, periodic (4 weekly) or longer..? Or is it "ad-hoc"?

18.2.8 Inputs

E.g…

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- Issues to review
- Papers to discuss
- Oversight of topics

18.2.9 Agenda

E.g. across typical length of meeting, what is agenda structure?

- Review of X (30 mins)
- Review of Y (15 mins)
- Instructions to issue (15 mins)

18.2.10 Outputs

- Instructions issued
- Actions agreed
- Escalations
- Papers, minutes and decision capture
- Reports generated (escalated to whom?)

18.2.11 Governance and Authority

**This may be placed before Inputs/Agenda/Output

- Where meeting sits in CRL hierarchy
- What parent child meetings are there?
- What can it do and not do?
- What authority does it have?

*When is this meeting expected to start and end?

DIAGRAMS MAY BE ADDED TO EXPLAIN STRUCTURE/FORMAT
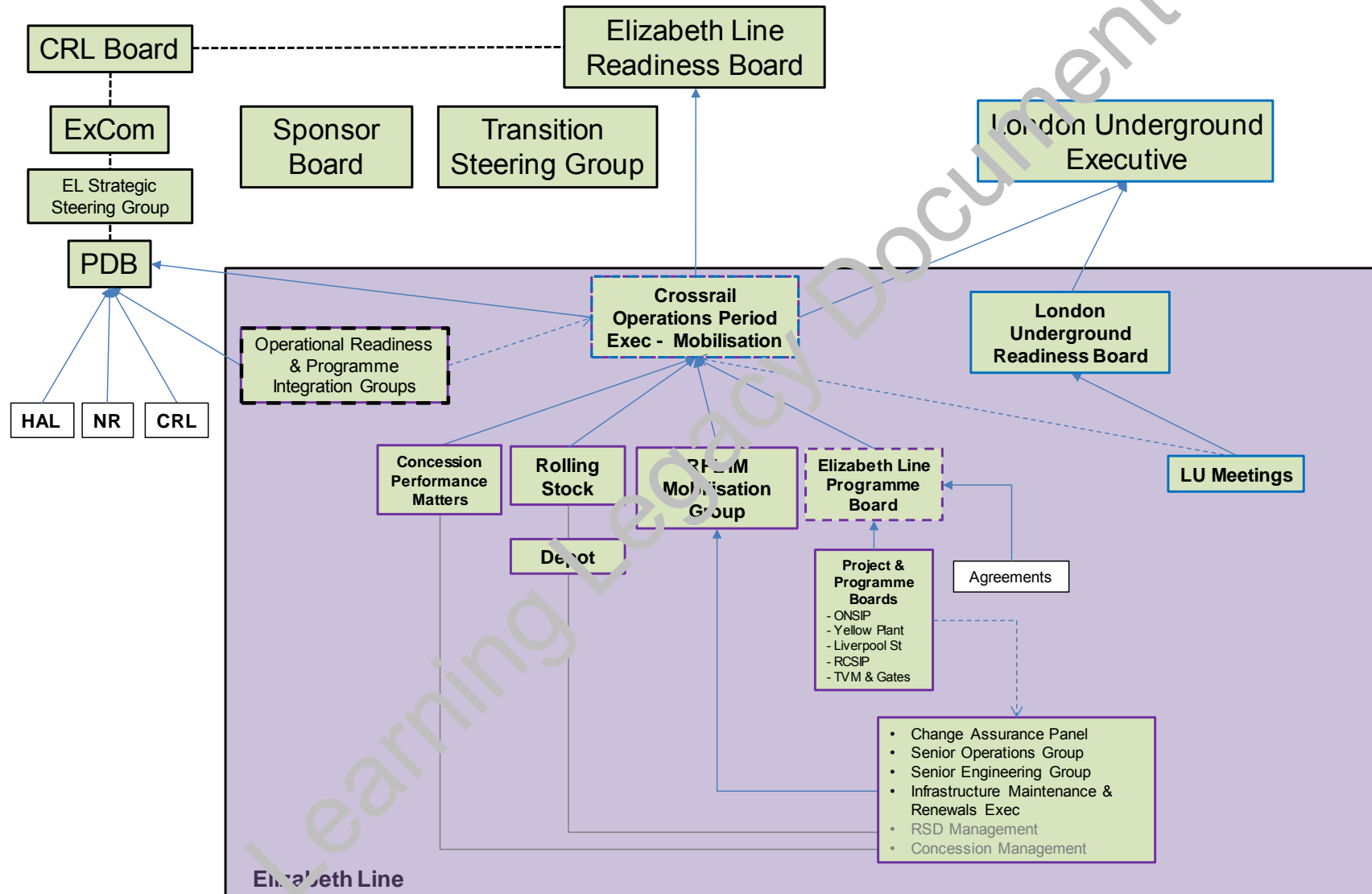
18.3 Operations Directorate Governance Model

Figure 9 – Operations Directorate Governance Model

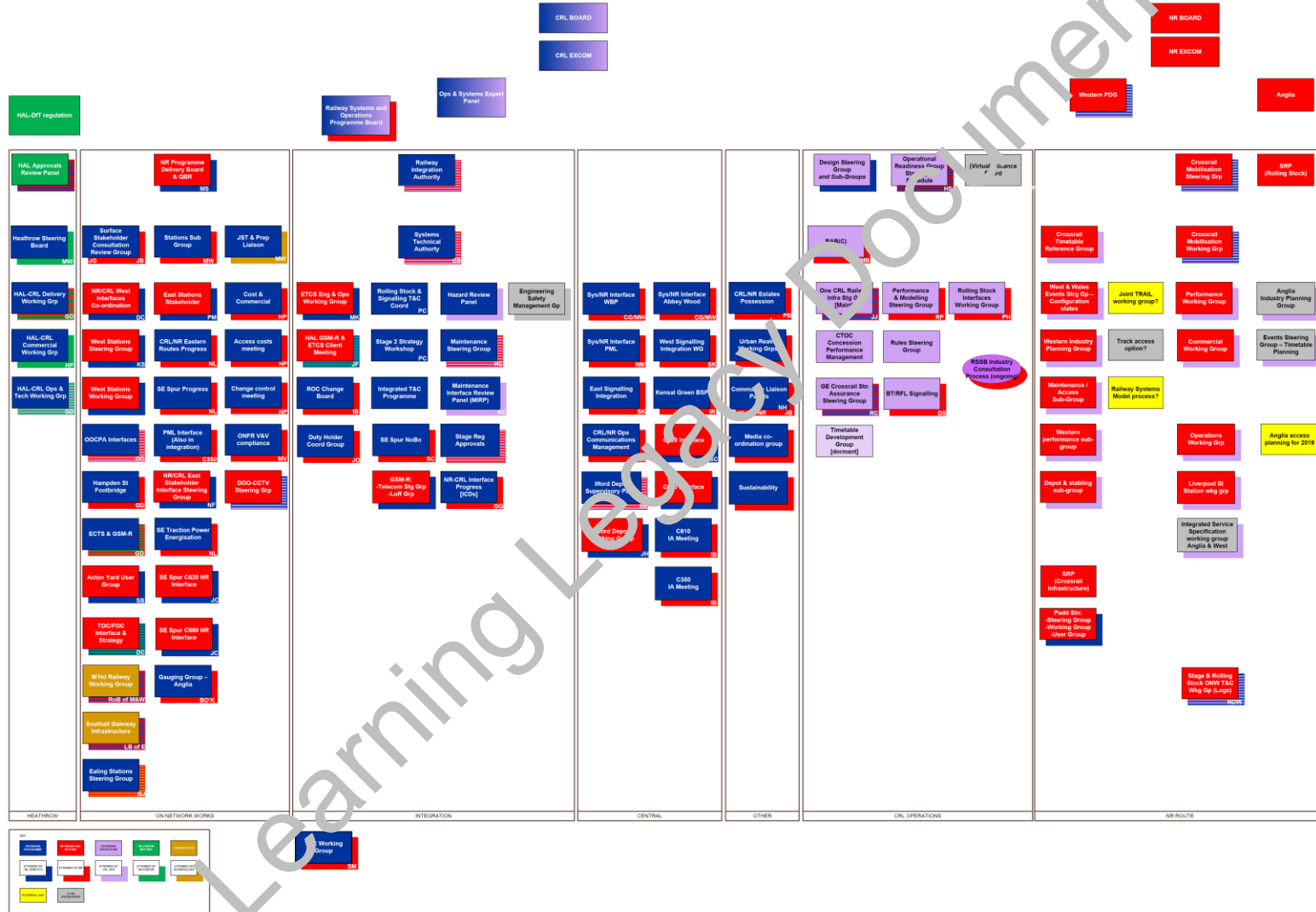**CRL RESTRICTED**

18.4 CRL Surface – NR Governance and Interface Meetings

Figure 10 – NR Governance and Interface Meetings

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