1 PURPOSE

This procedure defines how VolkerRail (VR) will manage Design through each stage of the Project life cycle to achieve business compliance with Legislation, Industry/Client Standards, and support application of other VR procedures. The Design management handbook provides the business with the tools to enable a consistent approach to the management of Designers to support the successful delivery of Design on Projects and is part of a framework of procedures in the engineering assurance handbook.

The Design management handbook shall ensure that:

- During the pre-contract stage robust engineering support is provided to ensure effective technical appraisal of Client documentation and enable informed selection and appointment of Designers. Provide engineering input at the right time to identify Risks and opportunities, support technical reviews and help achieve internal settlement to enable competitive, compliant and innovative tender returns to our Clients.
- During the mobilisation stage Designers are mobilised effectively to manage Project Risks, realise value engineering opportunities, and provide the business with assurance that the Designer is ready to mobilise resources to commence production of Engineering Deliverables.
- During the Design stage the production of Engineering Deliverables for permanent and temporary works Design are robustly managed with a key focus on safety, programme, budget, and quality standards by;
    - Defining the arrangements for co-operation and co-ordination between Design and construction organisations, undertaking Design reviews, and obtaining progressive engagement, inputs and comments from all Project stakeholders to avoid surprises, abortive work, build trust, and increase the likelihood of “right first time”.
    - Applying health and safety by Design principles to drive best practice, producing Design Risk Assessment s which consider all elements of significant hazards throughout the life of the Designed item through construction, operations, maintenance, and demolition, and applying the principles of prevention to eliminate Risks or mitigate Risks as low as reasonably practicable.
    - Progressively monitor population of verification and validation matrices to ensure compliance with requirements documentation and any applicable National Technical Specification Notices.
    - Undertaking regular checks that Engineering Deliverables interface correctly with other Designs or constructed elements, including Temporary Works.
    - Providing Design check, review and approval against standards and facilitating efficient client acceptance of Engineering Deliverables
    - Assessing and recording the technical competence and capability of Designers
- During the delivery stage any construction issues emerging are managed using the technical query process to provide assurance they do not invalidate the accepted Design. Ensure production of As Built drawings and collation of Engineering Deliverables for the Health and Safety file.
- During the close stage the Health and Safety File is assured and returned to the Client, support final account with Designers and ensure archiving processes are followed to ensure copies of all key Project records are retained by VR.
- Throughout the Project lifecycle Designer performance and progress reporting is consistent across the business and accessible to inform future Designer selection and appointment.

The requirements specified within this procedure should be read in conjunction with the Construction (Design and Management) (CDM) Regulations 2015 and SAF53. SAF53 is the business procedure which sets out the requirements and principles to be implemented by VR to support compliance with the legal requirements of the CDM Regulations. The requirements specified in this procedure are part of VR’s means of control, so that duty holder responsibilities in the CDM Regulations are implemented to achieve a positive safety outcome.

This procedure and its requirements alone do not enable VR to comply with the CDM Regulations and SAF53. Complying with the CDM Regulations does not remove the need for VR to comply with other health and safety legislation appropriate to the work activity, including, for example, hazard identification and undertaking Design Risk Assessment s according to the Management of Health and Safety at Work Regulations 1999, providing a safe system of work according to the Health and Safety at Work Act 1974 and compliance with the Railways and Other Guided Transport Systems (Safety) Regulations 2006,

Common Safety Method for Risk Evaluation and Assessment Regulation (EU) and The Railways (Interoperability) Regulations 2011.

2 SCOPE

This procedure is applicable to the management of all VR permanent and temporary works Design activity including Design delivered internally and Design carried out by subcontract Designers on behalf of VR.

This procedure, or clauses within, may be substituted for an equivalent Client, Alliance or Project specific procedure. Any deviations shall not put the business at Risk and must be in agreement with the Professional Head of Engineering and Design Management.

3 REFERENCES (INPUTS) / RELATED DOCUMENTS

- Health and Safety at Work etc. Act 1974
- Management of Health and Safety at Work Regulations 1999
- Construction (Design and Management) Regulations 2015
- The Railways and Other Guided Transport Systems (Safety) Regulations 2006
- Common Safety Method for Risk Evaluation and Assessment Regulation (EU) and The Railways (Interoperability) Regulations 2011
- NR/L2/RSE/100/02 ‘Application of the Common Safety Method for Risk Evaluation and Assessment’.
- NR/L2/RSE/100/03 ‘The Application of the Interoperability Regulations for Infrastructure Projects’
- NR/L2/RSE/100/05 ‘Product Acceptance and Change to Network Rail Operational Infrastructure’
- NR/L2/OHS/0047 ‘Managing Health & Safety in Construction Application of the Construction (Design and Management) Regulations to Network Rail’
- NR/L2/P3M/201 ‘Project Acceleration in a Controlled Environment’
- NR/L2/P3M/221 ‘Project Acceleration in a Controlled Environment - Manage Scope’
- NR/L2/RSE/02009 ‘Engineering Management for Projects’
- NR/L2/RSE/02009/01 ‘Assessment for Project Engineering Roles’
- NR/L2/RSE/02009/02 ‘The Management and Review of Engineering Deliverables’
- NR/L2/SIG/30035 ‘Signalling and Level Crossing Scheme Approval Process
- NR/L2/CIV/003 ‘Engineering and Architectural Assurance of Building and Civil Engineering Works’
- NR/L2/TRK/2500 ‘Engineering Assurance Arrangements for the Design and Construction of Track’
- NR/L2/ELP/27311 ‘Engineering Assurance Requirements for Design and Implementation of Electrical Power’
- NR/L2/TEL/30022 ‘Engineering Assurance Arrangements for Communications Engineering Schemes and Services’
- NR/L1/TEL/30100 ‘Telecoms Design’
- NR/SP/ERG/24020 ‘Engineering assurance arrangements for Ergonomics within Design and development Projects’
- NR/L2/CSG/STP001/04 ‘Managing Variations to Network Rail Standards and Control Documents and Railway Group Standards’
- NR/L2/ENV/015 ‘Environment and Social Minimum Requirements for Projects – Design and Construction’
- NR Terms and Conditions for Quality
- NR/L2/INI/CP0075 ‘Entry into Operational Service’
- NR/L2/MTC/089 ‘Arrangements for the exchange of asset data’
- NR/L2/INF/02202 ‘Records management of health and safety files’
- SAF53 ‘Construction (Design and Management) Regulations 2015’

- ENG01 ‘Engineering Assurance Handbook’ (and associated modules)
- Q37 ‘Information Management (BIM) Procedure Manual’
- QUA12 ‘Information Management Procedure’
- SIG607 ‘Signalling Design Production’
- OLE04 ‘OLE Assurance of Design changes’

4 ABBREVIATIONS AND DEFINITION OF TERMS

Term / Abbreviation	Description
Approved for Construction Design (AFC)	An Engineering Deliverable that has been prepared, checked and approved by competent persons in accordance with the contract (or equivalent), requirements and all standards; successfully completed the Interdisciplinary Coordination; where applicable, successfully completed Network Rail Technical Approval; successfully completed the Network Rail Technical Acceptance process; and is endorsed as ‘Approved for Construction’ by the CEM.
Bid Manager	The person who is accountable for the overall bid management and co-ordination of all activities on behalf of VR for a specific Project during the Pre-Contract Stage.
Check	The independent act of examining in detail the work done to determine that all statutory, mandatory and client functional process and technical requirements have been applied to a deliverable to the expected level of quality.
Contractor(s)	A person or organisation providing deliverables, products or services for any part of the Project works.
Contractor’s Engineering Manager (CEM)	The appointed person within each Design and/or construction organisation contracted to Network Rail, (or to a party other than Network Rail where agreed with Network Rail) with overall accountability for all that organisation’s engineering activities applicable to that specific CR-T; including those undertaken by subcontracted organisations.
Contractor’s Responsible Engineer (CRE)	The appointed person within a Design and/or construction organisation contracted to Network Rail, (or to a party other than Network Rail where agreed with Network Rail) with accountability for the day-to-day management and co-ordination of the technical and engineering activities within a specific engineering discipline for a specific CR-T.
Contract Requirements – Technical (CR-T)	A form of agreement and specification for Works, appended to a Contract, which creates and defines obligations between a Project and a Design and / or construction organisation, in the form of technical requirements.
Design	An approved plan or convention for the construction / manufacture / assembly of an object or system / parts of a system. This includes all plans, elevations, schematics, calculations, software, quality, safety, materials and other key elements which verify that requirements have been met.
Design Manager	The person who is accountable for the overall Design management and co-ordination of all Design activities on behalf of VR for a specific Project.

Term / Abbreviation	Description
Design Risk Assessment (DRA)	Risk assessment carried out by the Designer on all construction aspects, phasing and the proposed use of the finished works by all proposed construction operatives, installers and end user groups. This includes stakeholders, operators, maintainers, passengers, third parties etc. The focus is to identify, develop and document engineered controls; to control Risks to an 'as low as reasonably practicable' (ALARP) level.
Designated Project Engineer (DPE)	A professional engineer, appointed to a Portfolio, Programme or Project, accountable for the technical assurance of all engineering, Design and construction activities.
Designer(s)	An organisation, or individual, who prepares or modifies a Design for a Project (including the Design of temporary works); or arranges for, or instructs someone else to do so.
Engineering Deliverable	An Engineering Deliverable is the evidence submitted to Network Rail to support the acceptance reviews undertaken by the DPE at key stages of the Project as defined in the CR-T.
Engineering Milestone Review (EMR)	Engineering Milestone Reviews tie together the Projects engineering activities, and acts as the integration, assurance and control layer between the Project management methodology in use and the individual engineering discipline activities as shown in NR/L2/P3M/201.
Hazard Record	A management tool, which may be a spreadsheet, database, document or specific software, used for identifying, analysing and managing safety Risks on a Project. It may contain details of Design and construction hazards and records the control measures implemented to manage the residual Risk to an acceptable level. It is initially produced before the first Design decision is made. It is maintained through the life cycle of a Project. On completion of the Project it forms part of the Health and Safety File.
Interdisciplinary Check (IDC)	An assessment to confirm that the information included in the Engineering Deliverable is compatible and conforms to the requirements of all other Engineering Deliverables with which it is expected to interface. The check confirms that all permanent works, temporary works and all existing systems are fully coordinated and integrated
Interdisciplinary Review (IDR)	A review to confirm that the information included in the Engineering Deliverable appears to be compatible and conform to the requirements of all other Engineering Deliverables with which it is expected to interface. The review should confirm that all permanent works, temporary works and existing systems have been co-ordinated and integrated.
Lead Design Organisation (LDO)	The organisation with the accountability and responsibility for integrating the Design, sub-systems and existing infrastructure at Project and/or at program level.
Portfolio	A collection of Projects and Programmes of infrastructure work on the network.
Programme	A temporary structure which has been created to coordinate, direct and oversee the implementation of a set of interdependent Projects and activities in order to enable outcomes and benefits related to the organisation's strategic commitments.

Term / Abbreviation	Description
Project	A unique set of coordinated activities with definite starting and finishing points, undertaken to meet specific objectives within defined time, cost and performance parameters.
Project Manager	The person who is accountable for the overall Project management and co-ordination of all Project activities on behalf of VR for a specific Project.
Risk	Effect of uncertainty on objectives or an uncertain event which, should it occur, could impact positively or negatively on the outcome of defined objectives.
Review	The independent act of examining a sample of the work done to ensure that it appears to have been undertaken competently and appears that all statutory, mandatory and client functional process and technical requirements have been applied to a deliverable to the expected level of quality.
Technical Compatibility	Technical compatibility means an ability of two or more structural subsystems or parts of them which have at least one common interface, to interact with each other while maintaining their individual Design operating state and their expected level of performance.

5 PROCESS

Please find flow charts in Appendix A.

5.1 PRE-CONTRACT STAGE

This Pre-Contract Stage shall be read in parallel and managed in compliance with COM02 'Pre-Contract Manual'.

5.1.1 Responsible Accountable Consulted Informed

Process Step (Clause numbers in brackets)	PH of Eng & Des Mgt	General Manager	Bid Manager	Design Manager	Engineering Manager	Project Engineer(D)	Project Engineer(C)	SIM
Pre-Contract Stage (5)								
Mobilise engineering resources (5.1.2)		A/R	C	I	I	I	I	I
Technical appraisal of client PQQ/ITT (5.1.3)		I	A	R	R	R	R	R
Raise tender queries/Risks from appraisal (5.1.3)		I	A	R	R	R	R	R
Propose Designer(s) procurement strategy (5.1.4)	C	A/R	C	C	C	C	C	
Verify Designer(s) organisation capability (5.1.4)	A	I	I	C	R	C	C	C
Establish the Designer(s) ITT (5.1.5)			A	R	C	C	C	C
Appraisal of Designer(s) tender responses (5.1.6)		I	A	R	C	C	C	C
Check Designer(s) technical competence (5.1.6)	A	I	I	C	R	C	C	C
Finalise Designer(s) selection (5.1.7)		A/R	C	C	C	C	C	C
Establish Risk Register (5.1.8)		A	R	R	C	C	C	C
Technical Review of VR proposal (5.1.9)		A	R	R	C	C	C	C
Undertake VR settlement meeting (5.1.10)		A	R	C	I	I	I	I
Submit offer / VR contract award (5.1.11)		A	R	C	I	I	I	I
Provide Tender Handover to Project team (5.1.12)			A/R	I	I	I	I	I
Make information accessible to Project Team (5.12)			A	I	I	I	I	R

5.1.2 Mobilise Engineering Resources

The General Manager is accountable for ensuring that an organisational structure is established to support the Pre-Contract Stage and is responsible for mobilising an appropriate level of engineering resources who hold the right technical competence. The organisational structure and level of engineering resources deployed will be dependent on the scope, size, and complexity of the Project, along with programme timescales and key milestones.

The General Manager shall allocate engineering resources to support the Bid Manager. Any concerns over the performance, competence, or capacity of the engineering resources shall be resolved by the General Manager.

If any role identified in the RACI table above has not been mobilised during the Pre-Contract Stage, the Bid Manager, shall re-allocate these duties amongst team members and record in the Bid Management Plan.

5.1.3 Appraise Client PQQ/ITT

The Bid Manager shall ensure the Client PQQ/ITT is robustly appraised by the engineering resources deployed during the Pre-Contract Stage of the Project and shall allocate the responsibility of tasks and manage completion in the required timescales to meet the tender requirements and any key tender programme milestones.

The multidisciplinary and discipline specific engineering resources deployed (for Design and construction) shall complete the technical appraisal of the Client PQQ/ITT and shall complete the tasks allocated to them during the tender period by the Bid Manager.

This may include, but is not limited to:

- Review of scope/requirements.
- Identification of any non-compliances to engineering and technical standards.
- Supporting production of scope of works / responsibilities / scope split matrix.
- Identification of Risks and opportunities.
- Defining the Design and construction delivery strategy.
- Producing a delivery solution and methodology
- Assessing the time/resource/materials required to deliver the works.
- Ensuring the tender programme contains all Design and construction deliverables including integration across disciplines, and that it compliantly delivers the scope of works.
- Author and Review technical written responses.

The engineering resources shall raise any tender queries through the Bid Manager to request information and/or clarify any technical ambiguities.

The engineering resources shall escalate any significant Risks or issues identified in relation to the Client PQQ/ITT to the Bid Manager for direction and approval on the way forward. This may include missing or underdeveloped Engineering Deliverables which increase the Risk profile to a level that may not be tolerable for VR to price the services and provide a compliant tender response. This may inform a revised Bid/No Bid decision.

5.1.4 Initial Designer(s) Selection

The General Manager shall define the procurement strategy for Designer(s) on the Project. The strategy shall determine any proposed alliance, joint venture, exclusive partnership arrangements, or competitive tender, and the proposed split of Design responsibilities between internal and external Designer(s). This may be agreed in consultation with, or following the direction of, the senior management team for the business. The initial selection shall consider proposed Designer(s) recent performance for VR in terms of programme, commercial, quality, health and safety, and behaviours. The initial selection shall also consider proposed Designer(s) organisation capability for the scope, size, and complexity of the Project and resources levels with the capability, capacity, and local knowledge of the Project location.

NOTE: This decision can have a significant impact on the success of the Project and must be an informed decision made in consultation with engineering. At the discretion of the General Manager this may include the Professional Head of Engineering & Design Management and/or other discipline Professional Heads dependent on the scope, size, and complexity of the Project.

The Engineering Manager shall verify that any Designer(s) selected are competent and have the organisational capability to support compliance with the legal requirements of the CDM Regulations. The Engineering Manager shall check any proposed Designer(s) are on VRs Approved Supplier List to provide assurance they hold the relevant Rail Industry Supplier Qualification Scheme (RISQS) codes and are approved for the Design activity they are proposed to undertake on the Project. If they are not on VRs Approved Supplier List, this should be escalated to the Professional Head of Engineering & Design Management for direction on the way forward. This will ensure management of the associated Risk and the strategy and timescales for getting them approved to support the Project is feasible.

The General Manager shall approve the initial selection and the proposed procurement strategy for Designer(s). This will determine which Designer(s) will receive an ITT from VR to support the Project.

5.1.5 Establish the Designer(s) ITT

The Design Manager shall ensure an ITT is prepared and issued to the Designer(s) and shall coordinate the required input from the wider bid team.

This shall include, but is not limited to:

- Client ITT/Requirements and notification of any appraisal findings
- Detailed Responsibility Matrix or Scope Split matrix showing requirements for VR and the Designer(s).
- Proposed engineering management arrangements, allocation of engineering roles, Design integration option, and Design Review and meeting strategy.
- Any known sequence/staging and methodology for construction, testing or commissioning that may impact the Designer(s) scope of works and how Designs are packaged.
- Responsibilities and arrangements for compliance with NR/L2/ENV/015 ‘Environment and Social Minimum Requirements for Projects – Design and Construction’
- VR Project Controls requirements, planning and scheduling standards, Primavera P6, any known programme key milestones and target dates.
- VR commercial requirements and any Client imposed requirements for pricing, draft copy of the professional services agreements, type of contract, terms and conditions, principles for heads of terms, level of professional indemnity insurance, limit of liability, payment protocols, forecasting, change control, inflation, formal communication, and instructions.
- VR quality requirements, and any Client imposed requirements under the NR Terms and Conditions for Quality.
- Arrangements for meetings and workshops for Project management, commercial, Design and engineering and support needed through the Project delivery and close stages (see guidance in Appendix B).
- VR reporting requirements, periodically or monthly cycles, for progress, commercials, client requirements, Design close calls, lessons learnt, innovation and best practice.
- VR Procurement strategy and identification on any long lead items required for construction that may need early Design information to facilitate programme constraints.
- Information management requirements, and any Client imposed requirements, digital systems to be used, shared resources and templates to be used, as defined by the Senior Information Manager (see QUA12 ‘Information Management Procedure’).
- ITT scoring criteria, if competitively tendering to multiple Designer(s).
- Key VR IMS procedures and policies for which compliance is mandatory.

NOTE: The ITT process is iterative, providing as much clarity as possible will minimise the quantity and significance of any tender queries, assumptions or exclusions and allow Project proposals from different Designer(s) to be normalised. An ITT may not be required if all services are to be delivered by internal Designer(s) but the principles should be followed to ensure these requirements are communicated internally.

5.1.6 Appraise Designer(s) Responses

The Design Manager shall ensure the Designer(s) Project proposal is robustly appraised to confirm compliance with the VR and Client ITT requirements in consultation with the VR engineering resources deployed during the Pre-Contract Stage. The Design Manager shall review all assumptions and exclusions made within the Designer(s) Project proposal and challenge, refine and normalise as appropriate in agreement with the Designer(s). The Design Manager shall ensure any partial or non-compliances against the VR ITT requirements are clearly linked to an assumption or exclusion in the Designer(s) Project proposal. The Bid Manager shall ensure all assumptions and exclusions are integrated and/or mitigated within the VR Project proposal.

The Engineering Manager shall review the competence of the resources proposed for deployment by the Designer(s) and check they hold the relevant technical competence for the scope, size, and complexity of the Project and they have resources with the capability, capacity, and local knowledge of Project location.

The Bid Manager shall appraise the Designer(s) position on the type of Contract and the terms and conditions proposed in the VR ITT. This may influence final Designer(s) selection. It is desirable these principles are agreed progressively during the Pre-Contract stage to expedite contract award during the Mobilisation stage.

The level of Risk and compliance shall be established and recorded so it can be used to normalise tender returns and inform final Designer(s) selection.

5.1.7 Final Designer(s) Selection

The Design Manager shall coordinate and evaluate ITT responses and lead the review of the Designer(s) Project proposal, programme, and prices against the scoring criteria. This many include interviews with the Designer(s) as appropriate. The Design Manager shall, in consultation with the Bid Manager the VR engineering resources deployed during the Pre-Contract Stage, provide a recommendation with justification to the General Manager.

The General Manager shall validate the evaluation outcome and is responsible for the final decision on Designer(s) selection.

The Bid Manager shall notify the successful Designer(s) and is responsible for providing feedback to all participants explaining the reasons for successful or unsuccessful tenders.

NOTE: Final selection may not be required if all services are single sourced or wholly delivered by internal Designer(s).

5.1.8 Establish Risk Register

The Design Manager shall ensure any Risks pertaining to the Designer(s) Project proposal are communicated to the Bid Manager to be included in the Tender Risk Register for consideration at Technical Review and Settlement and/or form part of the onward submission to the Client. This shall include Risks or opportunities associated with the technical scope of the Project, technical compliance, key assumptions, and exclusions made during pricing and programming, technical competence, capability and capacity of the proposed supply chain and resources.

5.1.9 Technical Review

The Bid Manager shall ensure the Designer(s) Project proposal is fully integrated into VR Project proposal being presented for Technical Review.
The General Manager is accountable for ensuring that Technical Reviews of VR Project proposal are undertaken in advance of formal settlement. This is to ensure the technical aspects of the Project have been robustly priced and programmed during the Pre-Contract Stage. The Bid Manager is responsible for nominating attendees and defining who shall lead the Technical Review to establish the level of technical Risk and compliance. This shall include a detailed review of the engineering management arrangements and detailed responsibility matrix to provide assurance of technical compliance with the Client and VR ITT requirements.

NOTE: This may include an independent review, and include Professional Heads, dependent on the scope, size, and complexity of the Project at the discretion of the Bid Manager and/or General Manager.

The Bid Manager shall manage the outputs and any amendments made to the VR Project proposal as result of the Technical Review and shall ensure that any additional technical Risks or opportunities that are identified are added to the Tender Risk Register.

The Design Manager shall ensure that any comments and actions from the Technical Review that impact the Designer(s) Project proposal are coordinated, communicated, and agreed with the Designer(s) in advance of proceeding to Settlement.

5.1.10 Settlement Meeting

The Bid Manager shall ensure that all key Technical Review comments have been addressed and integrated into the VR Project proposal ahead of Settlement and shall define the attendees required at the meeting.

The Bid Manager shall manage the outputs and any amendments made to the VR Project proposal as result of the Settlement Review.

The Design Manager shall ensure any comments and actions from Settlement that impact the Designer(s) Project proposal are coordinated, communicated, and agreed with the Designer(s) in advance of proceeding with a formal offer to the Client.

5.1.11 VR Contract Award

The Bid Manager shall prepare the VR Project proposal and offer to the Client taking into consideration any Designer(s) feedback on any amendments from Technical Review or Settlement. If VR are successful with the tender submission, the Bid Manager shall manage any amendments made to the VR Project proposal as result of the negotiations with the Client in advance of VR Contract Award.

The Design Manager shall ensure any comments and actions from Client negotiations that impact the Designer(s) Project proposal are coordinated, communicated, and agreed with the Designer(s) in advance of proceeding to VR Contract Award.

The Bid Manager shall prepare the final VR Project proposal and ensure it is included within the completed Contract documents between VR and Client and managed via change control throughout the duration of the appointment.

5.1.12 Tender Handover

The Bid Manager is accountable for ensuring a robust tender handover is provided by the work winning team and shall coordinate and deliver handover of all key Pre-Contract information to the Project team.

The Senior Information Manager is responsible for mobilising and configuring the Project Common Data Environment and for ensuring all Pre-Contract information provided by the work winning team is uploaded to the Project Common Data Environment, configuring security, access and permissions to the Project team.

5.2 MOBILISATION STAGE

5.2.1 Responsible Accountable Consulted Informed

Process Step (Clause numbers in brackets)	Chief Engineer	General Manager	Project Manager	Design Manager	CEM	CRE(D)	CRE(C)	PIM	Commercial
Mobilisation Stage (5.2)									
Mobilise Engineering Resources (5.2.2)		A	R	I	I	I	I	I	I
Designer(s) Contract Award (5.2.3)			A	R	I	I	I	I	R
Assess Designer Competence (5.2.4)	A		R	C	R	R	C	I	
Establish Designer programme and trackers (5.2.5)			A	R	C	C	C	R	I
Manage Requests for Information (5.2.6)			A	R	R	R	C	I	I
Manage Design Surveys (5.2.7)			A/R	C	C	C	C	C	I
Manage Technical Queries (5.2.8)			A	C	R	R	C	I	C
Chair Start-up Meeting (5.2.9)			A	R	I	I	I	I	I
Engineering Management Briefing (5.2.9.1)			A	C	R	I	I	I	
Programme Briefing (5.2.9.2)			A	R	I	I	I	I	I
Commercial Briefing (5.2.9.3)			A	R	I	I	I	I	R
Information Management Briefing (5.2.9.4)			A	C	I	I	I	R	I
Requirements Management briefing (5.2.9.5)			A	C	R	I	I	I	I
Define strategy for Workshops (5.2.10)			A	R	I	I	I	I	I
Undertake Constructability Workshop (5.2.10.1)			A	C	R	C	C	I	I
Undertake Risk and Opportunity Workshop (5.2.10.2)			A	C	R	C	C	C	C
Undertake Resource Efficiency Workshop (5.2.10.3)			A	R	R	C	C	I	I
Value Engineering (5.2.10.4)			A	C	R	C	C	I	C
Undertake Readiness Reviews (5.2.11)			A	R	C	C	C	I	I

5.2.2 Mobilise Project Resources

The General Manager is accountable for ensuring that an organisational structure is established to support successful delivery of all Project stages and is responsible for mobilising an appropriate level of engineering resources who hold the right technical competence. The organisational structure and level of engineering resources deployed will be dependent on the scope, size, and complexity of the Project, along with programme timescales and key milestones.

The Project Manager shall mobilise the engineering resources to manage the Project, along with the wider Project team, in consultation with the General Manager and document the agreed arrangements in the Project Management Plan and Organisation Chart.

If any role identified in the RACI table has not been mobilised, the Project Manager, shall re-allocate these duties amongst team members and record in the Project Management Plan.

5.2.3 Designer(s) Contract Award

The Project Manager is accountable for ensuring that Designer(s) Contract Award is completed, and a signed Professional Services Agreement has been issued to the Designer(s) as soon as reasonably practicable following VR's Contract Award, or in line with the programme requirements.

The Design Manager shall assist and validate that the Designer(s) Project Proposal and VR Project Proposal are aligned and updated to include all updates and agreements made during Technical Review, Settlement and Client Negotiations. These shall be included within the completed Contract documents between VR and Designer(s) and managed via change control throughout the duration of the appointment.

The Design Manager shall ensure that Designer(s) are appointed and are in Contract to deliver in line with VR programme requirements. If this does not happen to schedule it prevents the Designer(s) from mobilising the resource required to support successful delivery of the programme. The Design Manager shall verify that a signed Contract is in place prior to authorising the mobilisation of Design resource to commence the Design Stage.

5.2.4 Appoint Project Engineering Team

The Chief Engineer is accountable for engineering appointments to Projects in compliance with NR/L2/RSE/02009 'Engineering Management for Projects' and the management of the competence of technical resources across the business.

The Project Manager and CEM (once appointed) shall ensure compliance with VR procedure ENG01M001 'Appointment of Engineering Roles' which details the process to be followed for engineering appointments. The CEM shall ensure CRE(D) compliance with VR procedure ENG01M011 'Managing Engineering Competency for Projects' (or equivalent process for external Designers) which details the process to be followed by appointed engineers to manage and record the competence of their Design resources working for them. The CEM and CRE(D) shall ensure the Design is produced by competent Designer(s).

To comply with the CDM Regulations VR must be able to demonstrate we have taken reasonable steps to satisfy ourselves the Designer(s) have the skills knowledge and experience, and organisational capability, to fulfil the role that we have appointed them to undertake in a manner that secures the health and safety of any person affected by the Project.

The Design Manager shall verify that all engineering appointments and competence checks of the Designer(s) have been undertaken and closed out prior to authorising the mobilisation of Design resource to commence the Design Stage.

5.2.5 Designer(s) Contract Programme

The Project Manager is accountable for ensuring that the Tender programme, produced during the Pre-Contract Stage, is developed during the Mobilisation Stage into the agreed Contract programme, normally, within 28 days of Contract Award.

The Design Manager shall ensure the Designer(s) section of the Contract programme is constructed by the Project controls team to align with the agree work breakdown structure for the Project. The Design programme constitutes an important part of the overall Contract programme managed by VR.
The CEM and CRE(D) shall input to validate all activities; ensure all Engineering Deliverables have been included; ensure the Design elements of the programme are accurate and correct; ensure that all key milestones; engineering logic; and durations for assurance are included for each Engineering Deliverable. Also ensuring the interdependencies between Engineering Deliverables for Design and surveys are robustly mapped.

The Design Manager shall establish a list of Engineering Deliverables to be produced during the Design Stage that includes all items that need to be submitted through the engineering assurance process, including staged, temporary, and permanent Design deliverables. QUA12F09 'Deliverables Tracker' and QUA12F03 'Information Delivery Plan' may be used but shall always be in accordance with QUA12 'Information Management Procedure'. These shall be produced during the Mobilisation Stage and maintained for the lifecycle of the Project.

The Design Manager shall verify that a Contract programme, Deliverables Trackers, and Master Information Delivery Plan is in place prior to authorising mobilisation of any Design resource to commence the Design Stage.

5.2.6 Requests for Information

The CEM is responsible for the management of Requests for Information (RFI) to inform engineering activities through all stages of a Project. The Project should expect to receive RFIs from the Designer(s) and Contractor(s), some of these require responses from the Client, some can be answered by the VR team, and some require responses from the Designer(s).

The CEM shall ensure that any information required to inform Design development is recorded formally

on an RFI form by CRE(D)s, such as, but not limited to, pre-construction information, existing asset records, source records, survey information, Engineering Deliverables produced by the Client in earlier stages that need to be updated/developed by VR under the Contract. The CEM shall ensure they detail the level of information required and when the information is required by. The RFI should normally align with an interface milestone in the Contract programme, this should be referenced within the request. This enables the Project team to identify which Design deliverables would be impacted if the information is not received on time. Commencing Design work without all the existing information about an asset is a Risk and routinely leads to abortive Design work.

To comply with the CDM Regulations the Client must provide pre-construction information as soon as is practicable to every Designer appointed, or being considered for appointment, to the Project. The Principal Designer must assist the Client in providing the pre-construction information. When preparing or modifying a Design, the Designer(s) must take into account the general principles of prevention and any pre-construction information to eliminate, so far as is reasonably practicable, foreseeable Risks to the health or safety of any person.

The Design Manager shall verify that any known RFI's relating to an Engineering Deliverable have been closed out prior to authorising mobilisation of the Design resource to commence the Design Stage.
The CEM shall ensure that an RFI Register is maintained for the Project using ENG01M002F05 'Request for Information Register'. This shall be produced during the Mobilisation Stage and maintained for the lifecycle of the Project.

5.2.7 Design Surveys

The Project Manager is accountable and responsible for management of the delivery of Design survey data to inform the Design Stage to meet the requirements of the Contract programme. This may include management of internal VR resource, external Designer(s) or Contractor(s) to obtain survey data dependent on the Project arrangements.

NOTE: The mobilisation, survey specification, survey delivery will be on a Project lifecycle running through mobilisation, delivery and close stages in parallel to the Design mobilisation activities detailed in this procedure. It is important there is sufficient time allocated in the Contract programme to undertake Design surveys ahead of the Design Stage.

The Project Manager should, in consultation with the CEM, ensure the Designer(s) produce a multidisciplinary survey specification to capture desktop and site surveys required to inform Design development on the Project. This should define what information is to be collected on site, how this will inform Design development and who the information will be used by, to ensure clear alignment between survey and Design deliverables in the Contract programme. The Designer(s) should ensure the data format and information management requirements are clearly defined in the survey specifications to avoid ambiguity.

NOTE: The survey specification should consider pre-construction information such as existing asset records and survey information to avoid any unnecessary survey activities and should also consider the use of technology where possible to reduce or eliminate safety critical working where possible. However, the survey specification should always collect the information needed to apply Health and Safety by Design principles and eliminate or mitigate Risk ALARP during the pre-construction phase.

The CEM should ensure survey specifications are reviewed, challenged, and accepted by VR. Where required, the survey specifications should be agreed with the Client.

NOTE: Access to the railway can be limited and the cost of collecting survey information can escalate quickly. It is important the quantity and level of survey data specified is suitable to inform Design development and for its intended purpose. Any integrated survey specification is desirable to avoid multiple surveys at the same location by different engineering disciplines and make efficient use of the access available.

The Design Manager shall coordinate the information exchange to the Designer(s) for use in Design development through the Information Manager in the Common Data Environment.

The Design Manager shall verify that all survey inputs have been provided for an Engineering Deliverable and formally issued to the Designer(s) prior to authorising mobilisation of Design resource to commence the Design Stage.

5.2.8 Technical Queries

The CEM is responsible for the management of Technical Queries (TQ) to inform engineering activities through all stages of a Project. The Project should expect to receive TQs from the Designer(s) and Contractor(s), some of these require responses from the Client, some can be answered by the VR team, and some require responses from the Designer(s). Each TQ shall provide options and an overview of the programme, commercial and safety implications of the proposed technical change.

Where possible, the CEM shall ensure that any TQs raised are discussed in advance with the Client. If it is deemed that a TQ is still required, then it shall be a record of a decision rather than a request for the Client to resolve an engineering issue.

The Design Manager shall verify that any key TQs required as an input for commencement of an Engineering Deliverable have been closed out prior to authorising the mobilisation of any Design resource to commence the Design Stage.

NOTE: Clearly, all TQs will not be raised and closed during the Mobilisation Stage. This intent here is to provide assurance that the Designer(s) understands the basis of Design and the key criteria before abortive Design effort is expended.

The CEM is responsible for maintaining a TQ Register for the Project using ENG01M002F04 'Technical Query Register'. This shall be produced during the Mobilisation Stage and maintained for the lifecycle of the Project.

A TQ response is not a formal Project instruction. If the TQ constitutes a change to the agreed scope of work, we must await formal instruction before implementing the change. The Design Manager shall coordinate with the Project Manager, CEM, Commercial team, and Designer(s) to assess the multidisciplinary impact.

The Design Manager shall ensure that no work commences on any technical change until the Project Manager confirms VR have been instructed to commence and implement the technical change.
If the TQ results in a technical change that requires the procurement of additional Designer(s) on the Project who were not considered at Pre-Contract Stage. The Design Manager shall ensure that Designer Selection process detailed within the Pre-Contract Stage of this procedure is robustly applied.

5.2.9 Start-up Meeting(s)

The Design Manager shall arrange and chair a Design start-up meeting with the Designer(s) during the Mobilisation Stage to set VR's expectations. The actions recorded at this meeting should be followed through and closed out at the next scheduled progress meeting.

The Design Manager shall follow the meeting agenda defined in ENG01M002F01 'Design Start-up Meeting Agenda'.

The Design Manager shall determine whether standalone briefings are required for the below or agree if these can be adequately briefed as agenda items at the start-up meeting, this will be dependent on the scope, size, and complexity of the Project. The aim is to ensure that the Designer(s) is briefed on the key engineering, programme, commercial and information management protocols to support successful Project delivery.

5.2.9.1 Engineering Management Briefing

The CEM is accountable for ensuring that an Engineering Management Plan is in place that is appropriate for the scope, size, and complexity of the Project to support successful delivery. The CEM shall ensure compliance with VR procedure ENG01M005 'Production of Engineering Management Plans' which details the process to be followed and arrangements that should be considered within.

The Design Manager shall verify the Engineering Management Plan is authorised, appropriately explains the Design management arrangements, and is briefed to the Designer(s) prior to authorising mobilisation of Design resources to commence the Design Stage.

5.2.9.2 Programme Briefing

The Design Manager shall ensure that the Designer(s) are briefed on the Contract programme during the Mobilisation Stage of the Project prior to authorising the mobilisation of Design resource to commence the Design Stage.

NOTE: This shall ensure that the Designer(s) are effectively briefed on the Contract programme to support successful Project delivery. This shall include, but is not limited to, key programme strategic, and tactical milestones, allocated durations for their key Design deliverables, key interdependencies between Designer(s) to share information with each other, details of the targets to facilitate VR's construction sequence, staging and testing and commissioning strategy.

5.2.9.3 Commercial Briefing

The Design Manager shall ensure that the Designer(s) are briefed on the commercial arrangements during the Mobilisation Stage of the Project prior to authorising the mobilisation of Design resources to commence the Design Stage.

NOTE: This shall ensure that the Designer(s) are effectively briefed on the commercial arrangements to support successful Project delivery. This shall include, but is not limited to, contract value, allocated budgets and Design hours for completion of their key Design deliverables, type of contract, application for payment mechanisms, reporting requirements for forecasting, change control, formal communication, and instructions.

5.2.9.4 Information Management Briefing

The Design Manager shall ensure that the Designer(s) are briefed on the information management arrangements during the Mobilisation Stage of the Project prior to authorising the mobilisation of Design resources to commence the Design Stage.

NOTE: This shall ensure that the Designer(s) are effectively briefed on the information management arrangements to support successful Project delivery. This shall include, but is not limited to, VR's Exchange Information Requirements (EIR), BIM Execution Plan, Systems and Document Storage Plan, Standard Methods and procedures to be followed, Information Delivery Plan and Detailed Responsibility Matrix to outline which Designer(s) are responsible for production of which engineering disciplines, Design packages and assets.

5.2.9.5 Requirements Management Briefing

The CEM shall establish a Validation and Verification Matrix (VVM) against the CR-T and/or Client Remit for the Project; and where VR is contracted to undertake on behalf of the Client, establish a VVM against the applicable NTSN(s) clauses. The CEM shall ensure each requirement is allocated an owner for the Design Stage and the Delivery Stage of the Project (where applicable). The CEM shall ensure that the VVM is used throughout the Design Stage and the Delivery Stage of the Project, to robustly ensure that the requirements are achieved in the Engineering Deliverables to demonstrate technical compliance against the CR-T and Client Remit.

The Design Manager shall ensure that the Designer(s) are briefed on the VVM and allocation of responsibility during the Mobilisation Stage of the Project prior to authorising the mobilisation of Design resources to commence the Design Stage.

5.2.10 Workshops

The Design Manager shall determine whether standalone workshops are required for the below or agree if these can be adequately briefed as agenda items at the start-up meeting or a single workshop. This will be dependent on the scope, size, and complexity of the Project.

5.2.10.1 Constructability & Buildability

The CEM should arrange a Constructability and Buildability Workshop with the wider Project team during the Mobilisation Stage to verify the construction sequence, staging and testing, and commissioning strategy established at Pre-Contract Stage. Buildability review and input from VR should continue through the progressive Design Reviews in the Design Stage.

The Design Manager shall ensure the Design packages and Engineering Deliverables to be delivered by the Designer(s) align with priorities to facilitate the planned construction sequence, staging and testing and commissioning strategy. The list of Engineering Deliverables shall include all items that need to be submitted through the engineering assurance process, including staged, temporary, and permanent

Design deliverables. This shall be produced during the Mobilisation Stage and maintained for the lifecycle of the Project.

NOTE: This needs to be undertaken before the Designer(s) commence the Design Stage to avoid abortive Design work. If the Design packages do not align with the planned construction sequence, staging and testing and commissioning strategy it will increase the Design fee and/or delay completion of Designs.

The Design Manager shall ensure this review has been undertaken appropriately during the Mobilisation Stage and prior to authorising mobilisation of Design resource to commence the Design Stage.

5.2.10.2 Risk and Opportunities

The Project Manager is responsible for maintaining a Risk & Opportunities Register for the Project and should develop the Risk & Opportunities Register produced by the Bid Manager during the Pre-Contract Stage.

The CEM should arrange a Technical Risk and Opportunities Workshop with the wider Project team during the Mobilisation Stage, to verify the technical items recorded at Pre-Contract Stage. The aim is to ascertain which of these Risks have materialised and which opportunities can be realised in the Design Stage, with a focus on capturing the benefits / outcomes / capabilities for the Client to meet the requirements for minimum viable product. The newly mobilised engineering team may identify new items that need adding to the Risk & Opportunities Register.

The Design Manager shall ensure this review has been undertaken appropriately during the Mobilisation Stage and prior to authorising the mobilisation of Design resource to commence the Design Stage.

5.2.10.3 Resource Efficiency

The CEM shall ensure the Designer(s) undertake a Resource Efficiency Workshop, during the Mobilisation Stage, or as early in the Design Stage as possible. This should be facilitated by environmental specialists, to identify opportunities to reduce waste, carbon, and consumption of natural resources on the Project.

NOTE: All Projects should aim to ensure VR meets the sustainability requirements of the rail industry, the regulators and stakeholders in every piece of work that VR delivers to create a sustainable railway fit for the future. Designer(s) as well as Contractor(s) shall seek to embed best practice in sustainability and social value in engineering processes.

The Design Manager shall ensure that any Risks identified are incorporated into the Risk & Opportunities Register and communicated to the relevant Designer(s) for mitigation during the Design Stage. The Design Manager shall ensure that any opportunities identified are communicated to the relevant Designer(s) and raised as Value Engineering proposals (see Clause 5.2.10.4).

The Design Manager shall ensure this review has been undertaken appropriately during the Mobilisation Stage and prior to authorising the mobilisation of Design resource to commence the Design Stage.

5.2.10.4 Value Engineering

The CEM shall ensure that any opportunity for value engineering, optimisation or efficiency on the Project identified in the Constructability Workshop, Risk and Opportunities Workshop, the Resource Efficiency Workshop, or by other means, follows the TQ process (see Clause 5.2.8). Each opportunity should be documented as a TQ which clearly identifies and defines the relevant options available for the Project and an overview of the multidisciplinary programme, commercial and safety implications of the proposed technical change.

NOTE: VR welcomes innovative ideas whether they are through use of different materials, plant or delivery mechanisms. However, these shall be proposed and managed appropriately dependent on the PACE phase awarded to VR and the scope, size and complexity of the Project.

The CEM and Design Manager shall demonstrate that the technical change proposed has a positive impact on the direct costs, programme or Risk profile of the Project and shall provide sufficient information for this to be reviewed in a practical manner. This will allow a determination on whether the proposal should be executed on the Project and ensure a 'best for Project' decision through the TQ process.

The Design Manager shall ensure that value engineering proposals are identified, reviewed, and instructed during the Mobilisation Stage prior to authorising the mobilisation of Design resources to commence the Design Stage.

NOTE: The aim is to identify opportunities before Design production has commenced and minimise any internally generated change or construction preference post completion of the Mobilisation Stage. Any opportunity developed after the Design stage has commenced will very likely result in a level of abortive Design effort which may minimise the value of the opportunity or prevent its implementation. Should an opportunity be raised during the Design Stage, approval of this opportunity should not delay completion of the services VR is contracted to undertake, and VR should be proceeding with the core scope until formal instruction is received. Designer(s) should not be working on any scope change without formal instruction.

5.2.11 Undertake Readiness Reviews

The Design Manager shall, in consultation with the CEM and Project Manager, decide whether to commence a Design package or Engineering Deliverable based on a Readiness Review in line with the completion and compliance with the sections of this procedure listed below.

- Designer(s) Contract Award completed (see Clause 5.2.3).
- Engineering appointments for CEM/CRE's / Designer(s) competence assessments (see Clause 5.2.4).
- Contract programme in place and agreed with Design Team(s) (see Clause 5.2.5).
- Receipt of key Design inputs through Requests for Information from Client (see Clause 5.2.6).
- Receipt of survey inputs / deliverables to inform Design development (see Clause 5.2.7).
- Agreement of key Technical Queries fundamental to developing the Design solutions (see Clause 5.2.8).
- Start-up Meeting held (see Clause 5.2.9).
- Engineering Management briefing to Design Team(s) (see Clause 5.2.9.1).
- Programme briefing to Design Team(s) (see Clause 5.2.9.2).
- Commercial briefing to Design Team(s) (see Clause 5.2.9.3).
- Information Management briefing to Design Team(s) (see Clause 5.2.9.4).
- Requirements Management briefing to Design Team(s) (see Clause 5.2.9.5).
- Constructability & Buildability Review held (see Clause 5.2.10.1).
- Risk and Opportunity Review held (see Clause 5.2.10.2).
- Resource Efficiency Review held (see Clause 5.2.10.3).
- Value Engineering Reviews held, and key decisions made (see Clause 5.2.10.4).

The Design Manager shall approve the Design resource to commence production of the Engineering Deliverables and/or Design packages, based on overall completion of the Mobilisation Stage ensuring that the holistic Risk associated is acceptable. The Design Manager can authorise resources to commence in advance of the mobilisation activities above being fully completed, but the commercial and programme Risk of this decision must be understood, managed, and recorded on the Risk Register.

NOTE: This robustness is required to avoid incorporating unnecessary Risk into the Design programme by commencing the Design Stage of the Project based on assumptions, before these key steps have been undertaken, or asking the right question just too late in the programme after many hours of Design production have been incurred, which leads to abortive work and/or programme delays that VR may not be able to recover from the Client.

5.3 DESIGN STAGE

5.3.1 Responsible Accountable Consulted Informed

Process Step (Clause numbers in brackets)	Project Manager	Design Manager	CEM	CRE(D)	CRE(C)	PIM
Design Stage (5.3)						
Design Integration Process (5.3.2)	A	C	R	I	I	I
Support and contribute to Design Reviews (5.3.3)	A	C	R	R	R	I
Record progressive Design Comments and Inputs (5.3.4)	I	I	A	R	C	
Maintain Design Decision Logs (5.3.5)	I	I	A	R	C	
Apply Health and Safety by Design (5.3.6)	I	I	A	R	C	
Produce Design Risk Assessment(s) (5.3.7)	I	I	A	R	C	
Risk Assessment under Common Safety Method (5.3.8)	I	I	A	R	C	
Design compliance to CR-T / Client Remit (5.3.9)	I	I	A	R	C	
National Technical Specification Notices (5.3.10)	I	I	A	R	C	
Obtain Environmental and Sustainability Input (5.3.11)	I	I	A	R	C	
Ongoing Constructability Review (5.3.12)	I	C	A	R	R	
Information Management Compliance (5.3.13)	A	R	R	R	R	C
Interdisciplinary Design Check (5.3.14)	I	I	A/R	R	R	I
Design Approval and Submissions (5.3.15)	A	C	R	R	I	I
Respond to Client Acceptance comments (5.3.16)	A	C	C	R	I	I
Published AIP / AFC Design (5.3.17)	A	C	R	R	I	I
Engineering Compliance Certificate (5.3.18)	A	I	R	C	I	

If any role is not present the Project Manager shall re-allocate these duties amongst team members and record in the Project management plan.

5.3.2 Design Integration

A Design integration option from NR/L2/RSE/02009 ‘Engineering Management for Projects’ must be selected to confirm how all permanent works, temporary works, and all existing systems are fully co-ordinated and integrated.

The CEM shall ensure the Engineering Management Plan defines the Design integration option along with the scheduling of Design Review meetings; the mandatory CREs, Designer(s), Contractor(s), and technical specialists required for attendance at these meetings.

The Project Manager shall ensure the arrangements are established appropriately by the CEM to ensure robust management of the Engineering Deliverables in the Design Stage to support successful delivery of the Project.

5.3.3 Design Reviews

Design Reviews must be undertaken to facilitate Design coordination with representatives from Designer(s), Contractor(s) and Client. The schedule, frequency and duration of these reviews will depend on the nature and pace of the Design work, however, the principle of ‘often and short’ shall be adopted to avoid surprises, abortive work and to build trust.

The CEM shall ensure these are held at Project, package or Engineering Deliverable level as appropriate dependent on the scope, size, and complexity of the Project so that Design development is monitored progressively to ensure a focus on the requirements that need to be met to successfully achieve final IDC, IDR, Technical Approval and Technical Acceptance.

Designer(s) must take all reasonable steps to provide, with the Design, sufficient information about the Design, construction or maintenance, to adequately assist the Client, other Designer(s)s and Contractor(s) to comply with their duties under the CDM Regulations.

Design development shall be reviewed progressively to facilitate early identification of Risks, issues, and opportunities, and significantly increase the likelihood of first-time acceptance of the completed Design.

The purpose of progressive Design Reviews is to:

- Promote collaboration & efficiency between the Client, Contractor(s), Designer(s) by providing the engineers responsible for Design acceptance an opportunity for early review.
- Review the status of Design, communicate latest Design information and encourage input
- Review Design comments tracker, actions and Design Decision Logs are up to date to record progressive comments and inputs from key stakeholders.
- Ongoing review of Design Risk Assessment(s) and CSM Hazard Record to ensure the general principles of prevention have been applied to eliminate, so far as is reasonably practicable, foreseeable Risks and ensure application of Health and Safety by Design (HSbD) principles.
- Identify potential areas of non-compliance with the Requirements Documents and CR-Ts.
- Identify opportunities for value engineering, innovation and hazard/Risk avoidance.
- Identify where variations to procedures are unavoidable so the Client can seek early agreement with the appropriate Asset/Procedure Owner.
- Review integration of environmental and sustainability requirements in the Design.
- Review staging arrangements/construction sequences are incorporated and coordinated within the Design, verify constructability and buildability, and identify requirements for early procurement, construction, or fabrication activities that need to commence before the AFC Design is completed.
- Review status of Pre-construction information, Requests for Information, Technical Queries and survey inputs required to inform Design development.
- Monitor compliance to Information Management requirements and utilise BIM models, clash prevention and detection techniques to facilitate coordination.
- Identification and mitigation of engineering interfaces across engineering disciplines and other adjacent Projects and confirm correct integration and co-ordination of the Project components, including temporary works, ahead of IDC/IDR.

Each CRE(C), along with Construction Managers, are the construction specialists for VR and must support the Designer(s) in Design Reviews to ensure the requirements above are progressively checked and recorded to ensure a positive safety outcome and ensure the Design solution aligns with VR and Client expectations.

5.3.4 Design Comments

The CEM shall ensure the Engineering Management Plan defines how progressive comments and actions will be recorded and managed throughout the Design Stage.

Each CRE(D) is responsible for recording decisions, comments, actions, Risks, issues, and opportunities raised at Design Reviews throughout the Design Stage. The aim is to progressively track, manage, close, and record all inputs into Design solutions from the Designer(s), Contractor(s) and the Client, so that assurance of Design coordination is undertaken progressively to reduce the number of comments raised later in the assurance process. The CRE(D) shall produce and maintain a register using ENG01M002F12 'DDR IDC IDR Comments Register' throughout the lifecycle of the Project.

5.3.5 Design Decision Logs

Each CRE(D) shall ensure a Design Decision Log is created, updated, and maintained and is formally issued with the Engineering Deliverable on submission. This may be an extract from the comments register or a standalone log, importantly, it must record the key decisions throughout the Design Stage that influenced the final Design solution.

Each CRE(D) shall ensure the CEM and Design Manager are notified of any resulting scope change which shall be managed as technical change.

5.3.6 Health and Safety by Design

The CEM shall ensure that the Designer(s) understand their legal responsibilities in respect of 'Health and Safety by Design' (HSbD) and the arrangements shall be documented in the Engineering Management Plan.

NOTE: Health and safety by Design is the elimination or control of health and safety Risks in infrastructure, products or processes by early consideration and addressing those potential Risks at the Design Stage. Too often the planning of new and modified works fails to take simple steps to avoid future hazards to the health and safety of passengers and workers. Better planning, more consistent application of standards, good practice and incorporating advice from operators and users at an early stage would help to reduce late changes in Projects to deal with emerging issues and drive down levels of ill health, incidents, and accidents in the longer term.

Each CRE(D) shall ensure that the Design Team(s) and third parties who are planning new work or making changes to existing infrastructure and systems, consider, through good Design practice, how they can make systems inherently safer for members of the public, passengers, and employees and with less Risk to health.

Each CRE(D) shall apply the following HSbD principles during Design development of Engineering Deliverables as defined by Network Rail here.

5.3.7 Design Risk Assessment(s)

Each CRE(D) shall ensure the Design is produced by competent Designer(s) as defined by in the 'Appoint Project Engineering Team' section in the Mobilisation Stage.

The CEM shall ensure each Engineering Deliverable produced in the Design Stage is issued with a Design Risk Assessment, to document control of technical hazards and associated Risks to support compliance with the legal requirements of the CDM Regulations.

Each CRE(D) shall ensure a Design Risk Assessment(s) are produced, and shall manage their Design Team(s), who shall, in accordance with the CDM Regulations, consider all elements of significant hazards throughout the life of the Designed item through construction, operations, maintenance and demolition. The Design Risk Assessment(s) is a key deliverable and enabler with respect to HSbD. Each CRE(D) shall ensure the Design Risk Assessment(s) applies the principles of prevention, as defined in Schedule 1 of the Management of Health and Safety at Work Regulations, to identify the measures that should be taken to reduce and control the Risks to health and safety. Aiming to avoid Risks where possible, evaluate those Risks that cannot be avoided/eliminated, and mitigate as low as reasonably practicable and put in place proportionate measures that control them at source.

Each CRE(D) shall communicate any residual Risk in the Design Risk Assessment(s) and Design documents.

5.3.8 Common Safety Method for Risk Evaluation and Assessment

Common Safety Method for Risk Evaluation and Assessment (Commission Implementing Regulation (EU) 402/2013), (CSM-REA), ensures that a 'suitable and sufficient' Risk assessment is undertaken on technical, operational, or organisational changes made to the railway that could significantly affect safety.

NOTE: Network Rail's arrangements for complying with CSM-REA technical and operational requirements are specified in NR/L2/RSE/100/02 'Application of the Common Safety Method for Risk Evaluation and Assessment'. This standard requires that CSM-REA Risk management process is applied for both significant and non-significant changes. The CSM-REA accountabilities and responsibilities for each role (actor) are detailed in the RACI of NR/L2/RSE/100/02.

The CEM shall record the arrangements for discharge of any CSM-REA activities allocated to VR in the Engineering Management Plan. The Design Manager shall ensure that any deliverables produced by the Client for previous engineering stages are obtained for update and development.

NOTE: This may include production of the System Safety Plan or System Definition Statement, support carrying out Hazard Identification, management of the Hazard Record, Risk management in accordance with CSM-REA Regulations, production of s Safety Justification Report and/or support any Independent Assessment (if the Project is significant).

The CSM Hazard Record is a key deliverable and enabler with respect to HSbD. The CEM, CRE(D) and CRE(C) shall support hazard identification activities in the Design Stage. A Hazard Record shall be created and maintained throughout the Project lifecycle.

NOTE: This may be managed by Network Rail and not VR directly.

Each CRE(D) shall support carrying out Risk management in accordance with CSM-REA Regulation and eliminate such Risks, where reasonably practical to do so, to as low as reasonably practicable, and communicate any residual Risk in the Design Risk Assessment(s) and Design documents.

5.3.9 Requirements Management

The CEM shall establish a Validation and Verification Matrix (VVM) against the CR-T and/or Client Remit for the Project. The CEM shall ensure each requirement is allocated an owner for the Design Stage and the Delivery Stage of the Project (where applicable). The CEM shall ensure that the VVM is used throughout the Design Stage and the Delivery Stage of the Project, to robustly ensure that the requirements are achieved in the Engineering Deliverables to demonstrate technical compliance against the CR-T and Client Remit.

Each CRE(D) shall populate evidence against the VVM requirements allocated to them to demonstrate technical compliance against the CR-T and Client Remit.

NOTE: Initially, this shall be a high-level explanatory statement and categorisation of status i.e. not assessed, not applicable, non-compliant, or compliant to ensure the Design is progressing compliantly. However, as the Design coordination process develops this should be checked and validated progressively by the CRE(D) and shall evolve into formal statements of compliance supported by evidence to provide technical assurance the Design is compliant with the requirement sets.

Each CRE(D) shall escalate any known non-compliances to CEM as soon as practicable.

5.3.10 National Technical Specification Notices

The Railways (Interoperability) Regulations 2011 (RIR) apply when placing new, upgraded, or renewed infrastructure into service.

NOTE: The roles which are actors within this process are detailed in the RACI of NR/L2/RSE/100/03 'The Application of the Interoperability Regulations for Infrastructure Projects'. Network Rail shall determine which National Technical Specification Notices (NTSNs) are relevant and to what extent they apply. VR may be asked to support production of the Project Authorisation Strategy and System Definition Statement, collation of evidence against NTSN clauses in a VVM, supporting production of the Technical File, and/or engagement with the Approved Body/Designated Body appointed to the Project.

The CEM shall record the arrangements for discharge of any of these activities allocated to VR in the Engineering Management Plan. The Design Manager shall ensure that any deliverables produced by the Client for previous engineering stages are obtained for update and development.

Each CRE(D) shall, with support of the CEM, provide evidence of compliance against the applicable NTSN(s) clauses.

Each CRE(D) shall escalate any known non-compliances to CEM as soon as practicable.

5.3.11 Environment and Sustainability

All Design development shall be supported by specialist environmental resources to deliver the environmental and social deliverables on the Project in accordance with NR/L2/ENV/015 'Environment and Social Minimum Requirements for Projects – Design and Construction'.

These resources shall:

- participate and ensure environmental input at the relevant Design Reviews.
- work closely with the CRE(D) to ensure all environmental and social Risks are identified, incorporated within the Design Risk Assessment(s), and proposed Design solutions, and their impact avoided, reduced, mitigated, compensated or opportunities for benefits enhanced, as applicable, for legislative compliance or to meet Client requirements.
- assess the environmental or social impact of any technical change proposed during Design

development; and advise on the necessary cause of action and provide opportunity to mitigate any impact.

The CEM shall ensure these environmental resources are invited to support the Design coordination process at Design Reviews and IDCs, as appropriate, to ensure a positive sustainable outcome and ensure Design solutions align with VR and Client expectations.

The CRE(D) shall seek support from the environmental resources to embed best practice in sustainability and social values on the Project within in the Engineering Deliverables they are responsible for producing.

NOTE: The environmental team is accountable for ensuring that all VR Projects aim to meet the sustainability requirements of the rail industry, the Regulators, and stakeholders in every piece of work that VR delivers to create a sustainable railway fit for the future.

5.3.12 Constructability Reviews

The CEM shall ensure constructability and buildability is reviewed progressively by the Designer(s), Contractor(s), and with the wider Project team during the Design Stage to progressively verify and validate the construction sequence, staging and testing and commissioning strategy.

The CRE(D) and CRE(C) shall ensure constructability and buildability is reviewed progressively at the Design Reviews, including interfaces with Temporary Works.

5.3.13 Information Management

The CEM shall ensure the Designer(s) are effectively following the information management arrangements to support successful Project delivery, this shall include, but is not limited to: Exchange Information Requirements (EIR), BIM Execution Plan, Detailed Responsibility Matrix, and Master Information Delivery Plan (see QUA12 'Information Management Procedure').

The CEM shall ensure the Designer(s) are deploying the federation strategy, as defined in the BIM Execution Plan and Engineering Management Plan, and proactively using the federated model and clash prevention/detection techniques to support identification of engineering interfaces between disciplines, existing infrastructure, and physical interfaces, to support confirmation of integration and coordination.

The Project Information Manager is responsible for ensuring the Designer(s) are following information management arrangements and will support the CRE(D), CRE(C), and Design Team(s) to achieve compliance.

NOTE: The Information Manager shall administer the Common Data Environment to control access, security, and permissions, and to ensure a positive safety outcome, coordinate work in progress, shared and published information exchanges between Designer(s), VR and Client to ensure right information, to the right person, at the right time.

5.3.14 Interdisciplinary Design Check

Interdisciplinary Check (IDC) and Interdisciplinary Review (IDR) meetings shall be undertaken in accordance with NR/L2/RSE/02009 'Engineering Management for Projects'. The CEM shall ensure an IDC is carried out on each Engineering Deliverable or Design package prior to the formal submission to Network Rail for acceptance.

NOTE: The aim of the Design coordination process set out above is to encourage collaboration between Client, Designer(s) and Contractor(s) progressively, to avoid surprises, abortive work and build trust, and reduce comments later in the assurance process to increase the likelihood of first-time acceptance of the completed Design. Therefore, the discipline engineers representing the Client, Designer(s) and Contractor(s) should be aligned in advance of IDC/IDR so a combined meeting is encouraged.

The CEM shall define the scheduling in line with the programme and the discipline CREs, Designer(s) and technical specialists required for attendance. The CEM shall attend, execute the IDC, and document all inputs and outputs of the IDC.

NOTE: IDC/IDR meetings get together all the discipline engineering leads on the Project to review and integrate the Design proposals. Each CRE(D) must work closely with the CEM and regularly review the planned meeting schedule to verify that the Designs are ready to avoid a failed meeting at abortive cost and programme delay.

Each CRE(D) shall ensure all comments, actions, Risks, issues, and opportunities raised throughout the Design Stage related to the Engineering Deliverable, including Technical Queries, are closed in advance of the IDC, where possible. Any that remain open should be communicated to the CEM. Prior to the IDC meeting, each CRE(D) shall coordinate the information exchange to the IDC attendees through the Project Information Manager in the Common Data Environment.

NOTE: An adequate period shall be given in advance based on the volume/complexity of information for the information to be reviewed by the IDC attendees.

Each CRE(D) shall check that their Engineering Deliverables interface correctly with other interfacing Designs or constructed elements and shall co-ordinate with relevant Designer(s) and participate in all appropriate IDCs so that there is correct deliverable integration, including Temporary Works.

Each CRE(C) shall, (when appointed), participate in IDCs to check that their discipline Design and construction interface correctly with the Design and construction of other disciplines.

The CEM shall maintain an IDC comments register for the Project using ENG01M002F12 'DDR IDC IDR Comments Register'. If combined IDC/IDR meetings are being undertaken this should be a combined IDC/IDR register. This shall be produced after the first IDC/IDR meeting and maintained for the lifecycle of the Project.

The Design coordination process is concluded and evidenced for a specific Engineering Deliverable or Design package through the IDC Certificate which is signed by all attendees.

5.3.15 Design Approval and Submission

The CRE(D) shall prepare and update the Design documentation to the agreed IDC comments and undertake Design Check, Review and approval of each Engineering Deliverable in accordance with the appropriate engineering discipline assurance standards.

The CEM shall review and authorise all Engineering Deliverables produced during the Design Stage prior to them being issued to the Client for acceptance in accordance with NR/L2/RSE/02009 'Engineering Management for Projects'.

If the review is successful, the CEM shall authorise submission to the Client for acceptance.

If the review is unsuccessful, the CEM shall manage any quality issues accordingly and/or close out of any comments raised with the CRE(D) directly. Once addressed the Engineering Deliverable shall be resubmitted to the CEM by the CRE(D). A Design Close Call and/or Non-Conformance Report may be raised dependent on the nature of the comments raised.

The CEM shall coordinate the information exchange to the Client through the Project Information Manager in the Common Data Environment.

5.3.16 Client Acceptance

Technical acceptance shall be conducted for all Engineering Deliverables. The technical acceptance review shall be conducted in accordance with NR/L2/RSE/02009 'Engineering Management for Projects'. Technical acceptance shall be facilitated by the DPE and undertaken by the discipline specific Project Engineers appointed to the Project and other technical stakeholders (as required).

All comments from the Client in relation to technical acceptance shall be provided on NR/L2/RSE/02009/F0044 'Document Review Notice (DRN)'. This shall categorise each comment based on the quality of the Design submission and/or any Client preference. An overall category of response shall be provided which is justified by the nature of the comments within.

On receipt of the DRN response from the Client. The CRE(D) shall address the Client comments in the DRN, provide supplier assurance responses to each comment and lead agreement and close out with Client.

NOTE: The aim of the Design coordination and IDC/IDR process set out above is to encourage collaboration between Client, Designer(s) and Contractor(s) progressively, to avoid surprises, abortive work and build trust, and reduce comments later in the assurance process to increase the likelihood of first-time acceptance. The CRE(D) and CEM

shall challenge appropriately if the Client has provided excessive comments and/or any Client preference is being introduced at this stage.

The CEM shall lead resolution, with support from the CRE(D), should the overall response category be rejected by the Client and shall document and agree the action plan for resubmission to avoid reoccurrence with those involved. A Design Close Call and/or Non-Conformance Report may be raised dependent on the nature of the comments raised.

The CEM shall maintain a Document Review Notice register for the Project using ENG01M002F13 'DRN Register'. This shall be maintained for the lifecycle of the Project.

5.3.17 Published AIP / AFC Designs

Once the Engineering Deliverable has been technically accepted by the Client, the CRE(D) shall prepare and update the Design documentation to the DRN comments. The CRE(D) shall prepare revisions based on the phase in the PACE lifecycle i.e. Approval in Principle (AIP) or Approved for Construction (AFC). The CRE(D) shall ensure any amendments to Designs other than those amendments identified during the initial technical acceptance process, or minor clerical errors, shall be resubmitted for further acceptance by the Client.

The CEM shall review and authorise all Engineering Deliverables produced during the Design Stage in accordance with NR/L2/RSE/02009 'Engineering Management for Projects' prior to them being issued at published in the Common Data Environment.

If the review is successful, the CEM shall authorise Engineering Deliverable to be published.

If the review is unsuccessful, the CEM shall manage any quality issues accordingly and/or close out of any comments raised with the CRE(D) directly. Once addressed the Engineering Deliverable shall be resubmitted to the CEM by the CRE(D). A Design Close Call and/or Non-Conformance Report may be raised dependent on the nature of the comments raised.

The CEM shall coordinate the information exchange of the published Design deliverable to the wider Project team through the Project Information Manager in the Common Data Environment.

5.3.18 Engineering Compliance Certificate

The CEM shall agree the strategy for Engineering Compliance Certificates (ECC) on the Project with the Client.

NOTE: This may be a strategy to provide ECCs to close out sectional completion of the works by PACE Phase (end of AIP / AFC), Design package or geographical location (where appropriate).

Once all Engineering Deliverables have been completed for the Design stage. The CEM shall populate the ECC, with support from CRE(D)'s, to confirm that the technical specifications for the works have been achieved, provide evidence of compliance through the complete VVM, disclose any variations to standards supported by evidence of variation approval, and confirm any additional variations or exceptions.

The DPE shall formally accept this evidence of compliance to the technical scope and requirements documentation. The fully signed ECC confirms that all Engineering Deliverables have been submitted and accepted for the Design Stage in accordance with NR/L2/RSE/02009 'Engineering Management for Projects'.

5.4 DELIVERY STAGE

5.4.1 Responsible Accountable Consulted Informed

Process Step (Clause numbers in brackets)	Project Manager	Design Manager	CEM	CRE(D)	CRE(C)	PIM
Delivery Stage (5.4)						
Proceed at Risk (5.4.2)	A	C	R	C	R	
Management of technical queries (5.4.3)	A	C	R	R	R	
Production of Red-line drawings (5.4.4)	I	C	A	I	R	I
Production of As-Built drawings (5.4.4)	I	C	A	R	I	I
Coordinate production of As Built drawings (5.4.4)	I	R	A	C	C	I
Coordinate return of As Built drawings to Client (5.4.4)	I	C	A	C	C	R

If any role is not present the Project Manager shall re-allocate these duties amongst team members and record in the Project management plan.

5.4.2 Proceed at Risk

The CEM and CRE(C) shall manage compliance with the requirements of ENG01M012 'Procedure for commencement prior to AFC'. This module applies to any requirements to undertake work or commit expenditure, including the purchase of equipment and materials, on Projects in advance of a Design package achieving AFC status.

5.4.3 Technical Queries

Following issue of the AFC Design, the Contractor(s) may identify a technical issue with, or propose a change, which is required to be made to the AFC Design.

Each CRE(C) for the engineering discipline shall ensure any post AFC queries are raised on a TQ in compliance with NR/L2/RSE/02009 'Engineering Management for Projects'. This is to ensure that any construction issues emerging during the Delivery Stage are robustly recorded and can be assessed to ensure they do not invalidate the accepted Design. The CEM shall engage with the Client and/or Designer(s) as required to delegate the response and/or consult on the best option (see Clause 5.2.8). If the technical issue is significant, it may require a Design update and resubmitting for further acceptance by the Client. A Design Close Call and/or Non-Conformance Report may be raised dependent on the nature of the issue raised.

If the TQ is a proposal or opportunity for efficiency that requires a technical change to the AFC Design. The CEM shall, in consultation with the Design Manager, Designer(s), and Client (as appropriate), review the TQ and determine if the technical change proposed has a positive impact on the direct costs, programme, or Risk profile of the Project (managed in compliance with Clause 5.2.10.4).

NOTE: This shall be carefully considered to ascertain the impact of the proposed technical change i.e. any effort to amend the AFC Design and/or any further technical acceptance from the Client which may minimise the value of the opportunity or prevent its implementation completely. Approval of this opportunity should not delay completion of the services VR are contracted to undertake, and VR should be proceeding with the core scope until formal instruction is received. Designer(s) should not be working on any scope change without formal instruction.

The CEM shall monitor the number of TQs raised post AFC, identify any trends should they occur, and document an action plan to avoid recurrence with the CRE(D), CRE(C), and others involved.

5.4.4 As Built Drawings

The CEM shall agree with the Client the full list of Design drawings that need to be As Built for the Project across all engineering disciplines, with support from each CRE(D) and CRE(C). Once the list is agreed, an owner shall be allocated to each drawing listed to define who is responsible for its production of both the Red Line drawings (if required) and As Built drawings.

NOTE: For some disciplines there will likely not be a requirement to produce Red Line drawings or As Built drawings for every AFC Design drawing produced for the Project. For example, Clients may not require reinforcement drawings provided at As Built. This shall be agreed by the CEM to avoid significant abortive effort by engineering resources.

Each CRE(C) shall produce a Red Line Drawing of the AFC drawing to show how constructed on site, red lining anything that has changed, considering ITP and quality records that evidence compliance to the AFC Design and any technical queries raised post AFC that may have resulted in technical change. Each CRE(C) should sign the Red Line Drawings to endorse that they accurately reflect the constructed asset and the infrastructure taken into operational use.

The CRE(D) shall manage Check, Review and approval of the As Built Drawings against the Red Line Drawings provided by the CRE(C) to reflect the constructed asset on site and the infrastructure taken into operational use.

NOTE: Discipline specific standards shall be applied where they exist to manage the production of As Built drawings e.g. Signalling. It is noted there is a defined standard to manage installation logs, testing logs, design modifications from AFC to final Maintenance Copies (As Built Drawings). Whilst Signalling uses different terminology the principles are aligned.

The Design Manager shall coordinate completion of Red Line drawings and As Built drawings, following completion of the physical works on site, in line with the design programme, on behalf of the CEM.

The Design Manager shall coordinate the exchange of these drawings between the Designer(s), Contractor(s) and Client through the Project Information Management in the Common Data Environment. The Design Manager shall ensure copies of the final As Built Drawings for all engineering disciplines are stored in the Common Data Environment ready for submission back to the Client for acceptance.

The Project Information Manager shall, with support from the CEM, CRE(D), and CRE(C) where required, coordinate the return and acceptance of final As Built drawings into Network Rail Records Group (NRG).

5.5 CLOSE STAGE

5.5.1 Responsible Accountable Consulted Informed

Process Step (Clause numbers in brackets)	Project Manager	Design Manager	CEM	CRE(D)	CRE(C)	PIM
Close Stage (5.5)						
Health and Safety File (5.3)	A	C	R	R	R	R
Archive Project information (5.4)	A	R	C	C	C	R
Close out Design accounts (5.5)	A	R	C	C	C	C
Knowledge Transfer (5.6)	A	R	C	C	C	C

If any role is not present the Project Manager shall re-allocate these duties amongst team members and record in the Project management plan.

5.5.2 Health and Safety File

The CEM shall ensure that the Designer(s) and Design Team(s) understand their legal responsibilities to ensure appropriate information is included in the Health and Safety File in accordance with the CDM Regulations.

NOTE: During the Pre-Contract Stage a QF703 'Health and Safety file Memorandum of Agreement and Deliverable Document Matrix (DDM) should have been produced by the Client and agreed with NRG.

The CEM shall ensure that Designer(s), specifically each CRE(D), supports VRs compliance with the legal requirements of the CDM Regulations, and supports the Client and Principal Designer discharge any Project requirements to facilitate compliance with NR/L2/INF/02202 'Records management of health and safety files'.

The CEM shall ensure all Engineering Deliverables identified on the DDM produced during the Design and Delivery Stage are progressively collated in the Health and Safety File by the Project Information Manager and CRE(D).

NOTE: The Project Information Manager shall advise metadata requirements in the Common Data Environment to expedite collation and organisation of Engineering Deliverables for the Health and Safety File.

The CEM shall Review completion of the Health and Safety File deliverables VR are responsible for providing on the Project as Principal Contractor, Principal Designer, Contractor or Designer. The CEM shall not submit a Health and Safety File, or close out any Project, until the DPE has confirmed that all Engineering Deliverables have been submitted and accepted, this includes As Built drawings.

The Project Information Manager shall, with support from the CEM, CRE(D), and CRE(C) where required, coordinate the return of the Health and Safety File into Network Rail Records Group (NRG).

5.5.3 Project Archive

The Design Manager shall support the Project Information Manager to ensure all Designer(s) Project information is archived in compliance with QUA10 'Retention of Records' and QUA11 'Management of IMS' and QUA12 'Information Management Procedure'.

5.5.4 Design Final Account(s)

The Design Manager shall support the Project Manager with demobilisation of Designer(s) appointment(s) and final account settlement to enable Project close out.

5.5.5 Knowledge Transfer

The Design Manager shall coordinate lessons learnt reviews, at the end of each Project stage as a minimum, to establish any best practice or lessons learnt from application of this procedure and the technical activities undertaken. This may be coordinated with a wider Project Manager review if being undertaken. The schedule, frequency and duration of these reviews will depend on the nature and pace of the Design work.

5.6 REPORTING

5.6.1 Responsible Accountable Consulted Informed

Process Step (Clause numbers in brackets)	Chief Engineer	PH of Eng & Des Mgt	Project Manager	Design Manager	CEM	CRE(D)	CRE(C)	PIM
Reporting (5.6)								
VWUK Group Reporting (5.6.2)	A	R		C	C			
VR Business Reporting (5.6.3)	A	R		C	C			
Project Reporting (5.6.4)		A	C	R	C	C	C	C
Design Close Calls (5.6.5)			A	R	R	R	R	R
Knowledge Transfer (5.6.6)	A	R	C	C	C	C	C	C

If any role is not present the Project Manager shall re-allocate these duties amongst team members and record in the Project management plan.

5.6.2 VWUK Group Reporting

The Professional Head of Engineering & Design Management shall attend the VWUK Head of Design Management meeting and provide an update on key Designer(s) and Project performance across the VR business. The Professional Head of Engineering & Design Management shall share best practice, lessons learnt and identify any escalations and support needed from the wider VWUK group.

NOTE: VR are part of the VWUK UK Design management steering group which is working to standardise and align Design management procedures across the group. This group is comprised of the Heads of Design Management from each business and meet regularly to share best practice and lessons learnt which further improves VR's Design management procedures.

5.6.3 VolkerRail Reporting

The Professional Head of Engineering & Design Management shall attend the VR Quality and Engineering Leadership Group and provide an update on key Designer(s) and Project performance across the VR business. The Professional Head of Engineering & Design Management shall share best practice, lessons learnt and identify any escalations and support needed from the business unit directors.

5.6.4 Project Reporting

The Design Manager shall manage the Designer(s) account on the Project and shall engage with the Project Manager, programme, and commercial teams to manage performance. In the event of any underperformance the Design Manager shall ensure the appropriate action is taken to address this. The Design Manager shall take action to maintain collaborative relationships and mitigate any disputes proactively to avoid withheld payment applications, claims or contra-charges (where possible).

The Design Manager shall provide performance scores for each Designer(s) working on the Project using the VR KPI reporting system to support account management. The Design Manager shall liaise with the Project controls and commercial teams to monitor the Designer(s) account position against programme and commercial targets. The applicability and frequency of reporting is defined in the system based on the scope, size, and complexity of the Project.

The Design Manager shall provide Design performance reporting at the monthly contract reviews and communicate the Designer(s) account position, programme and commercial performance to the Project Manager. The Design Manager should monitor Project performance against the key targets and explain any variance from these measures and advise what action has been taken in the period to mitigate.

5.6.5 Design Close Calls

The Design Manager shall ensure that the Designer(s) are fully engaged with the VR Design Close Call initiatives and follow the procedure outlined in SAF04G01d 'Design Close Call Reporting Guidance'.

5.6.6 Knowledge Transfer

The Professional Head of Engineering & Design Management shall coordinate collation of the data from across VR Projects from lessons learnt reviews and undertake trend analysis at business level. The output from this analysis shall be shared back with the business through briefings and/or updates to procedures to drive a culture of continuous improvement.

NOTE: The production and collation of this data at Project level in a consistent format gives VR access to key information to make informed decisions on how to improve Design management processes across the business. The data from each Project can be analysed and key trends monitored. VR strives for continuous improvement and will use this forum to share both best practice and any lessons learnt.

6 MONITORING

6.1 Proactive

Level 1 assurance checks shall be undertaken by the Project Manager, Design Manager, CEM, and CRE(D).

Level 2 assurance of compliance with the management of the system will be carried out in line with the proactive audit programme defined by the Professional Head of Engineering and Design Management. This shall be supported by the Quality Systems team on an annual basis against a targeted assurance checklist.
The procedure will be part of the annual Engineering audit programme.

Level 3 assurance will also be undertaken through third party monitoring for VR management certification audits or regulator/ client inspections.

6.2 Reactive

Reactive audits will be carried out following incident or at the request of the Chief Engineer, Professional Head of Engineering and Design Management, General Manager, Project Manager or Design Manager.

6.3 Retention of Records

Records are to be retained in accordance with VolkerRail procedure QUA10 'Retention of Records'.

The specific requirements for retention of records are defined within the QUA12F02 'Document Workflow Storage Plan' established for each Project.

7 ASSOCIATED GUIDANCE & INFORMATION

- Appendix A – Flow Charts
- Appendix B – Design & Engineering Meetings

8 DOCUMENTATION (OUTPUTS)

- ENG01M002F01 - Start Up Meeting Agenda Form
- ENG01M002F04 - TQ Register
- ENG01M002F05 - RFI Register
- ENG01M002F12 - DDR IDC IDR Comments Register
- ENG01M002F13 - DRN Register

9 ISSUE RECORD

Issue	Date	Comments
1	11/11/2015	New standard
1.1	05/02/2016	Minor change to Briefing Note (not re-issued as no change to procedure)
2	30/01/2020	Complete re- work of the module and inclusion of forms 3 to 14. Now called Design Management Handbook.
3	21/11/2025	The Design Management Handbook has been fully reviewed and updated following a five year review.

10 WHAT HAS CHANGED IN THIS LATEST ISSUE AND WHY

The Design Management Handbook has been fully reviewed and updated to reflect revised working practices, revised roles and to ensure consistency in quality throughout the business. The changes can be described as mainly editorial and restructuring with some minor technical changes.

Pre-Contract Stage additional clarity added on the responsibilities for mobilising engineering resources to support tenders and the strategy for procurement and selection of Designers.

Mobilisation Stage some editorial and restructuring of this section and removal of commercial reporting requirements.

Design and Delivery Stage activities now presented as independent sections to better align with pre-construction and construction activities. Additional clarity added on application of CDM and Safey by Design and inclusion of requirements for engineering to include environmental in design review process.

Additional requirements in Close Stage to clarify responsibilities for input in the Health and Safety File, archiving Design information and supporting commercial with final accounting projects with Designers. Previous reporting requirements rationalised to be confirmed in next update.

Alignment with QUA12 'Information Management Procedure' is now included throughout.

<u>Forms & Templates:</u>

- ENG01M002F01 - Start Up Meeting Agenda Form (no changes last updated June 2022).
- ENG01M002F02 - Design Project Risk Register (removed to allow templates to be defined within VR discipline specific engineering procedures).
- ENG01M002F03 - Invitation to Tender Forms (removed as now replaced by templated managed directly by work winning team in COM02 Pre-Contract Manual).
- ENG01M002F04 - TQ Register (no changes last updated August 2025).
- ENG01M002F05 - RFI Register (no changes last updated August 2025).
- ENG01M002F06 - Design Deliverables Register (removed and replaced by QUA12F09 'Deliverables Tracker' in QUA12 Information Management Procedure).
- ENG01M002F07 - Value Engineering Register (removed with Technical Query Register to be used to identify indicative cost and programme impacts of the option associated with any technical change).
- ENG01M002F08 - Change Impact Assessment Form (removed with Technical Query Register to be used to identify indicative cost and programme impacts of the option associated with any technical change).
- ENG01M002F09 - Commercial Performance Register (removed with data to be collected directly in Designer(s) KPI system once released).
- ENG01M002F10 - EWN Register (removed with data to be collected directly in Designer(s) KPI system once released).
- ENG01M002F11 - CR Register (removed with data to be collected directly in Designer(s) KPI system once released).

- ENG01M002F12 - DDR IDC IDR Comments Register (no changes last updated August 2025).
- ENG01M002F13 - DRN Register (no changes last updated August 2025).
- ENG01M002F14 - Design Performance Dashboard (removed with data to be collected directly in Designer(s) KPI system once released).

11 BRIEFING REQUIREMENTS

All new employees will receive an introduction to the Integrated Management System (IMS) at induction, according to the nature of the role.

All employees with an email address receive the 'Record of Revisions' each month, which details changes to the IMS. All Line Managers retain the responsibility to ensure their staff are briefed on changes as appropriate.

The following table defines how revised issues of this document are briefed to existing employees according to related specific responsibilities.

This is determined using the 'RACI' principle. Those roles identified as 'Responsible' and 'Accountable' should receive a formal awareness briefing facilitated by the Document Owner.

Discipline	Role	RACI	Type of briefing
SMT	Managing Director Director Major Projects Director Specialist Businesses HSQES Director HR Director Bid Director Commercial Directors Finance Director	Accountable	Awareness
Information Management	Head of Information Management Senior Information Manager Information Manager / Assistant Information / Document Controller	Responsible	Awareness
Work Winning	Bid Manager / Senior / Assistant Head of Estimating Estimator / Senior / Assistant	Responsible	Awareness
Project Management	General Manager Project Director Programme Manager Project Manager / Senior / Assistant	Responsible	Detailed
Engineering	Chief Engineer Professional Heads Engineering Manager Project Engineer / Senior / Assistant Engineer / Apprentice	Responsible	Detailed

Discipline	Role	RACI	Type of briefing
Design	Head of Engineering & Design Management Head of Design Design Managers Design Engineers / Senior / Assistant Principle / Principles / Apprentice	Responsible	Detailed
Commercial	Commercial Managers Quantity Surveyors / Senior / Assistant	Informed	Awareness
Construction Management	Construction Manager / Senior / Assistant Supervisor / Senior	Informed	Awareness
HSQES – Health & Safety	Head of Safety Head of Performance & Strategy Senior H&S Manager H&S Manager H&S Advisor Training & Competence Manager Training Coordinator	Informed	Awareness
HSQES – Quality	Head of Quality Systems Quality Systems Manager IMS Coordinator Quality Manager Quality Advisor Quality Engineer	Informed	Awareness
HSQES – Environment & Sustainability	Environment Manager / Senior Environmental Advisor / Senior Graduate Environmental Advisor Trainee Environmental Advisor Apprentice Environmental Advisor Social Value Advisor / Senior Trainee Social Value Advisor Apprentice Social Value Advisor	Informed	Awareness
Planning & Project Controls	Head of Planning & Project Controls Project Controls Managers Planner / Senior / Assistant	Informed	Awareness
Finance – Business Systems (Digital)	Head of Business Systems Business Systems Partner Data Analyst	Informed	Awareness
Procurement	Head of Procurement Procurement Manager Supplier Assurance Manager	Informed	Awareness

Competence	RACI	Type of briefing
CEM	Responsible	Detailed
CRE	Responsible	Detailed

Document Control	Type of briefing
VR/EAH/Elect	Electronic issue

12 IMS AUTHORISATION

Document owner approval:

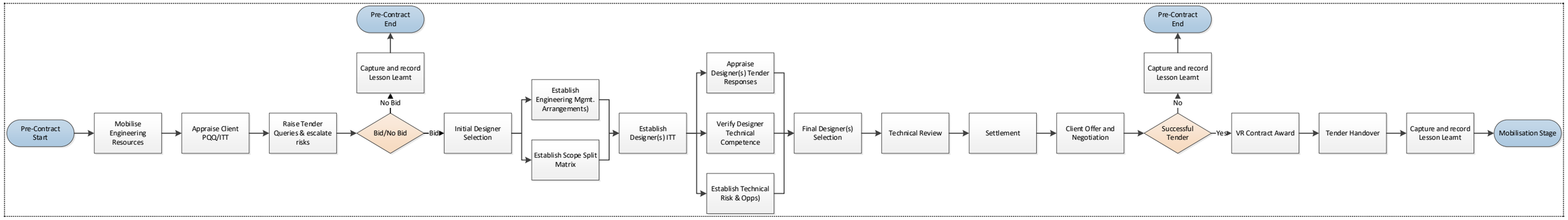
Michael Dunderdale, Professional Head of Engineering & Design Management, 21/11/2025

Approval for IMS:

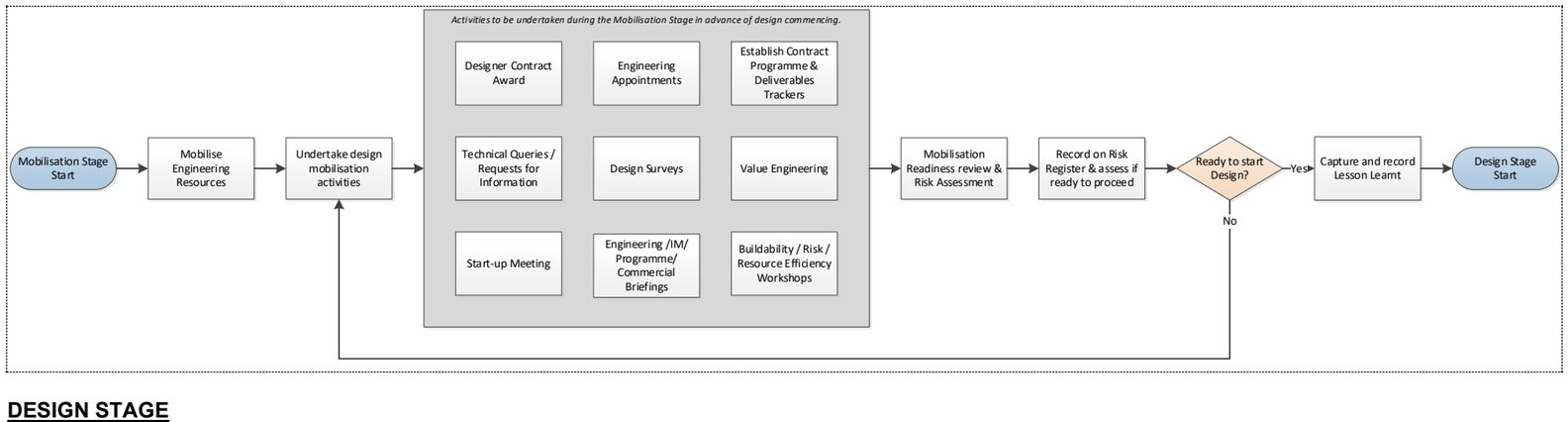
Paula Roberts, IMS Manager, 21/11/2025

APPENDIX A: FLOW CHARTS

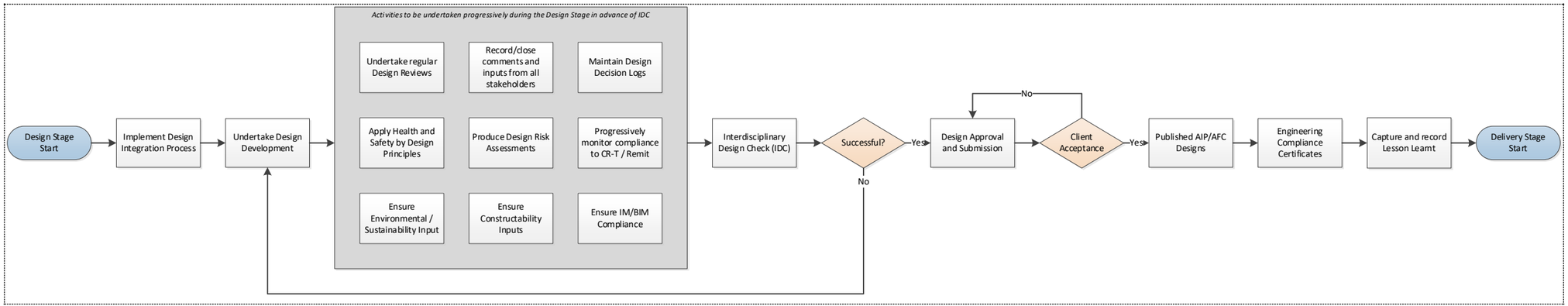
PRE-CONTRACT STAGE



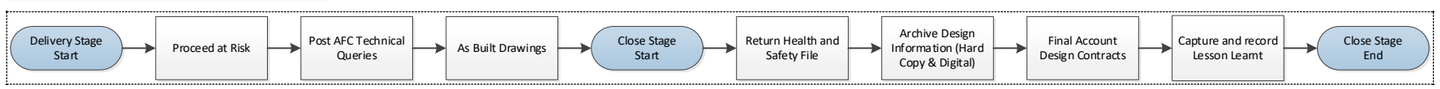
MOBILISATION STAGE



DESIGN STAGE



DELIVERY AND CLOSE STAGE



Meeting Title	Lead Party	Attendees	Frequency	Desired Output
Start-up Meeting	DM	PM, CEM, CRE's, PCM, QS	PACE stage	Project team aligned on key milestones
Design Progress Meeting	DM	PM, CEM, CRE's, Planner, QS	Fortnightly	Review of design status
VR Project Progress Meeting	PM	CEM, DM, Planner, QS	Fortnightly	Review of project status
Client Progress Meeting	Client	PM, CEM, DM, PCM, CM	Fortnightly	Review of project status with client
Contract Reviews	PD	PM, CEM, DM, PCM, CM	Monthly	Review of project status with General Manager
Construction/Buildability Workshop	CEM	DM, CRE's, PE's,	PACE stage	Align construction strategy and design delivery strategy
Risk Review / Workshop	CEM	DM, CRE's, PE's	PACE stage	Key design and construction risks identified
Value Engineering Workshop	CEM	DM, CRE's, PE's	PACE stage	Identify and evaluate opportunities for efficiencies
Resource Efficiency Workshop	CEM	DM, CRE's, PE's	PACE stage	Identify opportunities to reduce waste on the project
HAZID Workshops	DPE	CEM, DM, CRE's, PE's	As required	Project Hazard Record
Design Reviews	CRE	CRE, PE by discipline	Fortnightly	Progressive engagement and resolution of design comments before IDC
Interdisciplinary Design Checks (IDC)	CEM	CRE's, DM,	As required	IDC Certificate and record of comments
Interdisciplinary Design Reviews (IDR)	DPE	PE's, CEM	As required	IDR Certificate and record of comments
Lessons Learnt Workshop	DM	DPE, CEM, CRE's, PE's	As required	Record of best practice and lessons learnt