

ISSUE DETAILS

Reference	ENG01_M002	Issue No.	1	Issue Date:	01/12/2015
Title	Management of Subcontracted Design				
Status	New				
Compliance Date	Immediate				
Document Owner	Ben Mather, Professional Head of Civil Engineering				

BRIEFING REQUIREMENTS

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.

Role	RACI	Type of briefing
CEM	Accountable	Formal
Commercial Managers	Informed	Awareness
CRE	Informed	Awareness
Design Managers	Responsible	Formal
Planner	Responsible	Formal
Procurement Team	Informed	Awareness
Project Managers	Responsible	Formal
Quantity Surveyors	Informed	Awareness

PURPOSE

This standard mandates the requirements of a robust procedure for the safe production of Civil, Electrical, Overhead Line and Temporary Works Designs as required by Network Rail Group and Company standards.

This procedure shall ensure the following:

- Suitable management procedures are in place when letting design subcontracts.
- Provision of design and design check certification for the design of schemes.
- Approval by Network Rail of the design concept and the principles of design for schemes.
- Provide assurance to Network Rail that construction methods used will not adversely affect:
 - The integrity of any aspect of the infrastructure.
 - The safety of railway operations.
 - The safety of the public.
- Ensure that the design of temporary works is adequate and approved.
- Compliance with the clients specified requirements, so that the design is robust, fit for purpose and free from negative impacts on other disciplines.
- Where no equivalent industry standard is available, provide assurance to Network Rail to the extent that is reasonably practicable, that the design has been competently engineered.
- Subcontract designers are suitably managed in respect of programme and quality.
- Safe by Design protocols are comprehensively demonstrated.

SCOPE

This standard sets out the VolkerRail's requirements for all design related activities carried out by third party consultants detailed on the VolkerRail approved supplier list on behalf of VolkerRail.

Temporary works may be considered as an independent commission or as part of a permanent scheme.

This procedure may be substituted with a client or project specific procedure which may be more or less onerous than this document.

WHAT HAS CHANGED IN THIS LATEST ISSUE AND WHY

Change to scope of Briefing Note to align with Procedure Module ENG01_M002

ISSUE RECORD

Issue No.	Date	Summary of changes
1	11/11/15	As above
	05/02/2016	Minor change to Briefing Note (not re-issued as no change to procedure)

IMS AUTHORISATION

Approval	Name	Role
Document Owner	B Mather	Head of Multidisciplinary Design
Approval for IMS	Jack Pendle	Engineering Director
Accepted to IMS	Ross Reed	Assurance Coordinator

1. PURPOSE

This standard mandates the requirements of a robust procedure for the safe production of designs as required by Network Rail/Client Group and Company standards.

This standard shall ensure the following:

- Provision of design and design check certification for the design of schemes.
- Approval by Network Rail/Client of the design concept and the principles of design for schemes.
- Provide assurance to Network Rail/Client that construction methods used will not adversely affect:
 - The integrity of any aspect of the infrastructure.
 - The safety of railway operations.
 - The safety of the public.
- Ensure that the design of temporary works is technically adequate, considers buildability and is formally approved.
- Compliance with the clients specified requirements, so that the design is robust, fit for purpose and does not impact on other disciplines.
- Where no equivalent industry standard is available, provide assurance to Network Rail/Client to the extent that is reasonably practicable, that the design has been competently engineered.
- Compliance with VolkerRail's requirements for deliverables of the correct quality and allowing adequate timescales to enable installation, testing and commissioning.

2. SCOPE

This standard sets out the VolkerRail's requirements for all design related activities carried out by third party consultants detailed on the VolkerRail approved supplier list on behalf of VolkerRail.

Temporary works may be considered as an independent commission or as part of a permanent scheme.

This procedure may be substituted with a client, Alliance or project specific procedure.

2.1 Compliance

Compliance with this standard is necessary to ensure the company meets its legal obligations under current legislation such as the Health and Safety at Work Act 1974, Management of Health & Safety at Work Regulations 1999, Construction (Design & Management) Regulations 2015 and The Railways and Other Guided Transport Systems (Safety) Regulations 2011 (ROGS Regulations) etc.

3. REFERENCES (INPUTS) / RELATED DOCUMENTS

- CDM Regulations 2015
- NR/L2/CIV/003 – Engineering Assurance of Building and Civil Engineering Works
- NR/L2/EBM/STP001/04 – How to manage deviations to Network Rail and Railway Group Standards
- NR/L2/ELP/27311 – Engineering Assurance Requirements for Design and Implementation of Electrical Power Engineering Infrastructure Projects
- NR/L2/INI/02009 – Engineering Management of Projects
- NR/L2/INI/CP0047 – Application of the Construction Design and Management Regulations to Infrastructure Investment Projects
- NR/L2/INI/EDT/CP0091 – Specification for Computer Aided Design
- NR/L2/SIG/11201 – Signalling Design Handbook
- NR/L2/TRK/2500 – Engineering Assurance Arrangements for Track Engineering Projects
- NR/SP/ELP/21074 – Overhead Line Equipment Allocation Design for Railway Electrification

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- NR/SP/ELP/21130 – Technical Competency Requirements for Design of Overhead Line Equipment
- NR/SP/ELP/27030 – Overhead Line Equipment as Installed Data Records (Formerly RT/E/C/27030)
- NR/SP/ELP/27300 – Specification for Computer Aided Design formats for Electrification and Plant Documentation
- PAN/PMSE-E-CD-INS-0064 – Review of Engineering Deliverables

4. DEFINITIONS

DEFINITION	MEANING
Acceptance	An acknowledgement that a submission appears to be satisfactory.
Approval in Principle	Confirmation that a professionally competent person or body is satisfied that; <ul style="list-style-type: none"> • The design concept proposals for the scheme meet the requirements of the remit. • Suitable standards and design criteria are proposed for the detail design and design check.
Approved for Construction Design	Design that has been prepared, checked and approved by competent persons in accordance with all applicable Contract requirements and standards AND successfully completed an Interdisciplinary Check (IDC) process AND successfully completed the Network Rail Acceptance process.
Checker	The person responsible for the design check of a scheme who is authorised to sign the design check certificate on behalf of the checking organisation.
Construction, Design & Management Regulations	The CDM 2015 Regulations are about focusing attention on effective planning and management of construction projects, from design concept onwards. The aim is for health and safety considerations to be treated as a normal part of a project's development, not an afterthought or bolt-on extra. The object of the CDM 2015 Regulations is to reduce the risk of harm to those that have to build, use, maintain and demolish structures.
Contractor's Engineering Manager (CEM)	Person within every design and/or construction organisation contracted to Network Rail/Client, (or to a party other than Network Rail/Client where agreed with Network Rail/Client) with overall accountability for all engineering activities applicable to that specific Contract including those undertaken by sub-contracted organisations.
Contractor's Responsible Engineer (CRE)	Person within a design and/or construction organisation contracted to Network Rail/Client, (or to a party other than Network Rail where agreed with Network Rail/Client) 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 Contract.
Design	Information in the form of drawings, diagrams, photographs, calculations and/or words (including specifications for performance, materials and workmanship) which together describe in detail what is to be constructed and, where applicable, how it is to be constructed. The term is also used to describe the process by which such information is produced, including the carrying out of calculations where necessary.

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DEFINITION	MEANING
Design Check	An independent review of the design (including the carrying out of calculations where necessary) to ensure compliance with the remit and to confirm that adequacy and completeness of the Design.
Design Manager	Person with responsibility for managing the design process on behalf of VolkerRail.
Designer	The person responsible for the design of construction work who is authorised to sign the formal design submissions on behalf of the design organisation.
GRIP	Governance for Railway Investment Projects describes how Network Rail manages and controls projects that enhance or renew the national rail network.
Inter-Disciplinary Check	An assessment undertaken by the Design Organisation to confirm that the information included in the design is compatible and conforms to the requirements of all other design with which the design is expected to interface. The assessment is multidisciplinary and includes all engineering disciplines with which the design is expected to interface. Each design is assessed in its entirety.
Inter-Disciplinary Review	An assessment undertaken by Network Rail to confirm that all information included in the design is compatible with the infrastructure and with other projects being carried out in parallel.
Lead Design Organisation	The organisation which takes responsibility for the integration of multidiscipline designs associated with a project.
Risk Log	A management tool, which may be a spreadsheet, database, document or specific software, used for identifying, analysing and managing risks on a particular project. It contains 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 prior to the first design decision being made and is maintained through the life cycle of a project. Upon completion of the project it forms part of the Health and Safety File.
Scheme	Any planned work which results in permanent change to Network Rail's/Client infrastructure including new construction, relocation, alteration, refurbishment, recovery, decommissioning and demolition unless considered as temporary works.
Temporary works	Temporary works which are provided to enable construction work to be carried out but which are removed or which come out of use at, or before, the completion of the permanent works. The definition of the timescales associated with temporary works will be defined by Network Rail/Client.

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5. PROCESS
5.1 Pre-Contracts
5.1.1 Consultant Selection

The choice of sub-contract design consultant can impact on the success of the project and must be an informed decision taken between engineering, commercial and project management members of staff. The following list of considerations should be made but is not exhaustive:

- Recent experiences from other areas of the business.
- Commercial impact
- Ability to meet programme.
- Mobilisation period
- Capacity
- Location
- Level of tender support
- Technical experience in delivery of the specific type of project.
- Level of sub-contract support needed.
- RtG Performance

Designs can either be given to multidisciplinary design consultants or to a selection of independent constants who will usually take on only one discipline.

Multidisciplinary design consultants are to confirm the location where each discipline is to be carried out. A single point of contact is to be requested from the consultant.

Independent consultants need to be carefully considered as gaps between respective work scopes can appear. This needs to be managed by the CEM in conjunction with the PM.

5.1.2 Competency

Prior to works commencing, and ideally before contract award, the proposed consultant shall issue a competency report for acceptance by the project. The competency report shall detail all recent experiences of the proposed individuals who are to work on the contract, and their proposed role for the project i.e. designer, checker, surveyor etc. Supporting evidence in the form of CVs and certificates/licenses, CPD Folder/Log-Books shall form part of the report.

It is the responsibility of the CRE (Design) to validate the competency of the designers and checkers under NR/L2/INI/02009. VolkerRail is to receive a copy of this validation process which shall be formalised.

The competency selection requirements relating to CRE appointments shall be in accordance with the Engineering Assurance Handbook Module ENG/01/M001 Form F02.

5.2 Mobilisation Phase
5.2.1 Roles & Responsibilities

Roles and responsibilities are to be defined, specifically in respect of the single point of contact for the consultant who shall be known as the Design Manager. The Design Manager may also be the Project Manager or the project CEM.

The VolkerRail team should inform the design consultant of the wider project team including Project Manager, Commercial Manager and Planner but is to ensure that liaisons are made primarily with the Design Manager.

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Additionally, the project team shall inform the design consultant of the proposed manufacturers with whom they may need to liaise. The Design Manager is to be kept informed of all these liaisons, included being invited to all meetings and copied in on all correspondence.

The objective of this element of the standard is to ensure the Design Manager is fully informed at all times.

5.2.2 Scope Review

The team must clarify the instructed scope of works at the start up meeting and confirm the changes in the minutes of the meeting. Changes may arise from:

- Add/omit during the tender period.
- VR instructed changes to facilitate staging
- DRN comments

The effect of any work scope changes must also be recorded in respect of programme and commercial impacts.

The team shall understand if they require support from the consultant at construction stage and ensure that this is not omitted from the sub-contract scope.

5.2.3 Definition of Deliverables

VolkerRail need to understand the deliverables they are to receive. This will involve breaking down the technical work scope into discreet packages of work which may be encompassed into a GRIP 4 (Form A) or a GRIP 5 (Form B or Form F002) deliverable on a discipline by discipline basis. The GRIP cycle is detailed within Appendix A.

Each document shall be named and numbered in accordance with the records section of this document.

Each GRIP 4 and GRIP 5 deliverable shall have, in so far is practical, a list of documents associated with it i.e. drawings, specifications risk assessments, calculations etc.

An example is as follows:

GRIP Deliverable	Reference Number	Associated Document and Reference Number
Form B – 650 Power Distribution	BBK960-PW0027-FMB-EP-001	BBK960-PW0027-DRA-EP-0001 – Designers Risk Assessment BBK960-PW0027-CAL-EP-0001 – Feeder 1 Distribution Calculations BBK960-PW0027-CAL-EP-0002 - Feeder 2 Distribution Calculations BBK960-PW0027-DRG-EP-0001 – General Arrangement Drawing BBK960-PW0027-DRG-EP-0010 – DNO Wiring Diagram BBK960-PW0027-DRG-EP-0011 – DNO Cabinet Details BBK960-PW0027-DRG-EP-0012 – DNO Protection Arrangements BBK960-PW0027-DRG-EP-0100 – Protection Arrangements BBK960-PW0027-SPC-EP-0001 – PSP Performance Specification

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GRIP Deliverable	Reference Number	Associated Document and Reference Number
Form F003 – PSP Foundations	BBK960-PW0027-FM3-CIV-001	BBK960-PW0027-DRA-CIV-00001 - Designers Risk Assessment BBK960-PW0027-DRG-CIV-00001 – Topographical Survey BBK960-PW0027-DRG-CIV-00002 – General Arrangement BBK960-PW0027-DRG-CIV-00003 – Cross Sections and Elevations BBK960-PW0027-DRG-CIV-00100 – Steelwork Connection Details BBK960-PW0027-DRG-CIV-00200 – Piling Setting Out Details

5.2.4 Service Agreement

It is important for all parties to understand the levels of expectation in respect of the timescales associated with certain activities. These are to be scheduled in the mobilisation phase of the project. Examples are as follows:

- Time for consultant to respond to a Document Review Notice (DRN) and produce AFC drawings
- Time for consultant to respond to Request for Information (RFI)
- Time for VolkerRail to approve a change request
- Time for VolkerRail to issue minutes of meetings
- Time for VolkerRail to respond to a TQ

When a project is appropriate in respect of size, the service agreement may form the basis of KPIs which would involve the monthly measurement of the aforementioned bullets.

5.2.5 Programme

Prior to work commencing a realistic programme shall be produced for all design activities and agreed with the client. This is to be undertaken in conjunction with the design teams to facilitate buy in from all involved.

Furthermore, consideration must be given to maximising the time available to the design teams to undertake their works, rather than squeezing this period to allow the construction teams more comfort.

The design manager will own and take responsibility for the programme ensuring that the Project Planner undertakes updates as appropriate, and maintains revision control.

VolkerRail will import all third party programmes into its own master programme to enable an overall understanding to be maintained.

Where the design activity includes for multi-disciplinary developments (more than one of the individual railway system designs – p-way, signalling, electrification, power, comms or ancillary civils) staged integration and review milestones must be included to ensure the overall system design is appropriate, accurate and efficient.

There will be instances where the VolkerRail Panel team will be working in parallel with other Network Rail contracted designers. Where this is the case a Lead Design Organisation (LDO) will be appointed during the design mobilisation phase. The LDO can be the VolkerRail Panel team, the design resource undertaking the parallel design, Network Rail or an independent design resource appointed by Network Rail to purely undertake the LDO role. The role of the LDO is to produce and manage the integration of the design process.

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The design schedule will be updated on a regular basis with progress reported against the baseline. The metrics and progress monitoring measures will be established and agreed with Network Rail during the design mobilisation phase. These metrics will be readily identifiable units of design activities, the monitoring of which will provide early warning of programme certainty or risk of failure. Action plans will be developed in the light of any identified programme risk.

5.2.6 CEM & CRE Appointments

NR/L2/INI/02009 details the requirement for the appointment of a project CEM and discipline specific CREs. VolkerRail's process which covers the appointments of CREs (and CEMs) is ENG/01/M001.

The CEM shall normally be a direct employee of VolkerRail and shall always be authorised by the Engineering Director.

The CREs for the design phase shall normally be employees of the respective design consultant who will put forward their proposed candidate for the position to the CEM for approval. Ensuring that the individuals carrying the positions of design CRE are competent is imperative to the success of the project. The appointment should be a considered decision based on evidence, experience and references which shall all be recorded on Form ENG/01/M001 Form 02. This form, along with Network Rail's form referenced NR/L2/INI/02009 – F0040, should be issued to the client with the associated CV.

5.2.7 Innovations

VolkerRail welcomes innovative ideas whether they are through use of different materials, plant or delivery mechanisms. The Design Manager shall fully identify the opportunity for potential innovations available through design development at this early stage of the project. This avoids good ideas coming too late for approval by the client and their subsequent implementation. These innovations will be assessed on a 'best for project' basis with the impact on the whole life cost of the enhancement at the core of the assessment.

5.2.8 Safety by Design

It is imperative that the sub-contract design team understand their responsibilities in respect of 'Safe by Design'. They shall do this through the following mechanism:

- The design team shall have had certified and demonstrable CDM training within the last three years.
- The design team shall produce Design Decision Logs as detailed later in this standard.
- The design team shall produce a Designers Risk Assessment for every design submission.

In carrying out the design the design team shall evidence the following:

- That they have been able to reduce risk to the construction team in building to their design proposals
- That they have considered risk associated with the end user or operator of their design
- That they have considered the maintenance requirements of the end user of their design
- That they have considered hazards associated with demolition of the design at the end of its life

VolkerRail has a responsibility to ensure that the designer is competent and use RISQS assurance, along with the VolkerRail approved Supplier process to help discharge this responsibility.

It is the responsibility of the project engineering team, specifically the CREs, to discharge the responsibility of ensuring that all individuals involved in the design & delivery of the project are competent. This is undertaken through compliance with NR/L2/INI/02009 Engineering Management of Projects which places the assessment of competence on the CEM and CREs.

5.2.9 Meetings & Workshops

Meetings should be scheduled at the initial stage of the project. For most of the projects that are undertaken by VolkerRail, which exceed £1M, it should be anticipated that face to face meetings shall take place on a weekly basis. Workshops, covering risk assessment, value engineering etc. shall be scheduled when setting up the project, or in the case of frameworks, at lot level.

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All meetings are to be documented by the Design Manager. An action list to resolve issues shall be maintained and reviewed at each meeting.

Personnel attending the meetings shall cover all disciplines and both permanent and temporary works.

The client shall be included in these meetings as appropriate. These are to be scheduled in advance at a suitable venue and may be extended to workshops where the nature of the works is suitable.

As a minimum the meetings will be established to address the following elements, as shown in meeting minutes template ENG/01/M002 Form 2:

- Design scope.
- Safety considerations – hazard identification, “safe by design”
 - This is to ensure the implications of design changes are assessed and mitigation measures identified, reviewed and implemented. Where changes import risk/hazards in to the design they must be included in the Hazard Register and maintained for inclusion in the Health and Safety file.
- Sustainability
- Interface / integration requirements
- Design schedule progress monitoring
- Existing non-compliances with the infrastructure
- The requirement for any deviation from standard or technical non-compliance sign off
- New or novel design (i.e. first of type equipment or process)
- Constructability reviews
- Value Engineering
- The whole life cost assessment including consideration for operation, maintenance and subsequent demolition or decommissioning.
- Necessary approvals and review timescales.
 - The approval process will be agreed with Network Rail on a project by project basis. The process will involve all necessary stakeholders including the Network Rail Designated Project Engineer (and the wider Network Rail engineering / project management teams), the Route Asset Management Team (RAMS) and/or the relevant maintenance organisation, the Network Rail route operations team, the Network Rail Sponsor (The Client) and others identified during the mobilisation of the design phase. Certain schemes will be sponsored by parties external to Network Rail and these third parties (or their nominated representatives) will also need to be included in the review process.
 - External bodies, such as local authorities, local planning authorities, the Environmental Agency, Highway Agency and other statutory bodies may also need to be included in the approval or liaison process. The requirement to interface with these parties will also be assessed during the design mobilisation phase.

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5.2.10 Change Control

At the project initiation the designer shall receive a scope document which details the projects inclusions, exclusions and assumptions submitted as part of the Volker Rail bid. These items are to be discussed with the client at the start up meeting to confirm their validity, from which the design process can commence.

In the event of un-scoped works becoming necessary to fulfil the client's requirements, the designer shall submit a Technical Query detailing the change, revised costs for completion and programme. Until client approval of the TQ has been obtained work on the un-scoped element of the design shall not commence.

5.3 Delivery
5.3.1 Project Risk Register

The design team shall create and maintain a project risk register. A template is provided with this procedure referenced ENG01-M002-F002.

In the mobilisation phase of the project a project risk workshop shall be held. Under the requirements of NR/L2/INI/02009 it is the responsibility of the CEM to chair this workshop.

The CEM shall maintain and update this project risk register through regular reviews with the designer.

The project risk register is to be integrated with the client's hazard identification process and be inclusive of all key stakeholders such as:

- Client or Sponsor
- Asset Manager
- Maintenance
- Operations
- Project manager
- Designers
- Contractors
- Independent Assessment Bodies

Where Network Rail is the client, the integrated project risk register shall form part of the Entry into Service documentation.

5.3.2 Design Decision Logs

The design team shall create and update a log of design decisions with each submission which can be supplied to the client as appropriate.

The logs shall cover the following areas:

- Submission reference
- Log number
- Details of the issue
- Details of resolution
- Date raised
- Date closed
- CRE details

Records shall be maintained on the server for review at all times. They shall be retained in accordance with section 5.3.6 of this document.

When additional work is found to be necessary, or instructed by the client, this is to be logged and the safety implications assessed and mitigated against. The associated risks are to be recorded in the designer's risk assessment.

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5.3.3 Technical Queries

The project should expect to receive technical queries from the proposed design consultant. These shall be managed in a project Technical Query register, which shall be the responsibility of the CEM.

Technical queries which can be answered by the VolkerRail project team should be answered accordingly and not issued to the client.

The design consultant should request the next TQ number from the client to ensure that the differing systems and numbers are not confused. The project shall use one numbering system only, as set out in the records section of this document.

5.3.4 Requests for Information

The design team shall request project specific health and safety information from the client. Typically this would include:

- Buried services
- Known sources of contamination
- Asbestos information
- Ground Investigation data (if not contracted to undertake)
- Existing H&S file
- Risk logs
- Environmental assessments
- Existing layouts
- Cross sections
- Bonding Plans
- P-Way/Signalling Plans
- Structural Drawings

The drawings shall be supplied in 'dgn' format where available. If unavailable, relevant paper copies of drawings can be re-drawn in the appropriate format subject to a suitable commercial arrangement being in place. The details not relevant to the design shall be removed for clarity.

5.3.5 Value Engineering

VolkerRail's clients expect that value engineering is considered during the design period. Value engineering workshops are to be carried out as detailed in the meetings section of this procedure.

Value engineering workshops, attended by key design representatives, potential subcontractors and the client, will satisfy this requirement. A formal record of workshops are to be taken and maintained in the project files. Regular reviews are to be undertaken. These should be undertaken on a bi-monthly basis as a minimum.

A key element of value engineering can be standardisation which can avoid design duplication and help retain a common competency. Each design discipline is to consider how this may be addressed.

Key outcomes of the value engineering workshops will be:

- Creating steps towards eliminating design duplication
- Creating steps to enable the bulk ordering of materials where possible
- Creating steps to avoid workload spikes for suppliers
- Creating steps to utilise known competencies.

Smaller projects may consider a value engineering register to satisfy the requirements. This shall be reviewed on a regular basis and retained in the project files.

The design consultant may forward an alternative proposal or procedure for addressing value engineering.

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5.3.6 Records

Records shall be kept at each stage of the process. These shall include drawings, specifications, site survey sheets, design check sheets and all Network Rail/Client Forms. Documents shall be revised at each new issue. The following numbering format is to be used unless the client dictates otherwise:

Client Project Number	VolkerRail Project Number	Document Type	Discipline	Number	Revision
TBC	TBC	TQ – Technical Query CoC – Certificate of Conformance IDC – IDC Certificate FMA – Form A FMB – Form B LET – Letter WPP – Work Package Plan TB – Task Brief DRA – Designer’s Risk Assessment MEM – Memo TMP – Temporary Works CAL – Calculation RFI – Request For Information TQ – Technical Query ENG – Engineering Doc	CV – Civils TL - Telecoms EP – Electrification & Plant NIL – No Discipline SG – Signalling TK – P-way COM – Commercial	4 digit number	P – Provisional A – Approval in principle issue B – Detailed Design Issue C – Construction Issue Z – As-Built Issue Followed by sequential number 01, 02 etc

I.e. 12345-SI0011-TQ-NIL-001

Note that the numbering of drawings is similar and is dictated within NR/L2/INI//EDT/CP0091 Specification for Computer aided design formats for Electrification and plant documentation.

5.3.7 Surveys

An appropriate amount of time shall be utilised to diligently prepare for surveys which may be either intrusive, or purely visual.

The consultant shall fully define the nature of the surveys required which will include details of the information they need to capture. Access arrangements for each area of the site will be determined allowing full use of possession working as appropriate. Where more than one consultant is being used on the project surveys are to be combined wherever possible.

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A detailed programme of surveys can then be produced. This will address the full scope as detailed in the contract requirements.

Surveys should be prepared for with the following aspects undertaken:

- A WPP / TBS will be produced and submitted to the client for approval (as appropriate to intrusive works) in a timely manner, prior to the commencement of the works and may, or may not be produced by the consultant design team.
- Safety critical staff will be booked if internal staff cannot be utilised.
- Where appropriate a project specific induction will be given by the relevant construction team prior to attending site.
- A Safe System of Work shall be produced by a competent person and any associated possessions booked.
- Buried service records shall be requested if not already provided by the client.
- Existing infrastructure records shall be requested if not already provided by the client.
- Surveys will only commence on site following:
 - Receipt of approved WPP / TBS.
 - Agreed SSOWS safety paper work.
 - All staff have received a full brief on the works and their particular tasks as outlined in the Task Brief and a SWL safety brief.
 - Receipt of buried services for all intrusive ground investigation surveys.

The site survey shall be undertaken with full knowledge of the proposed solution and work scope, allowing all details to be gathered and recorded. Designers shall not sign off a design for a site which they have not visited to assess site constraints.

5.3.8 Early GRIP Stage Design Activities

Framework and Alliance arrangements will often require that VolkerRail is involved prior to outline design stage (GRIP 4). The principles of this standard are to be maintained unless the project has formalised its own arrangements.

5.3.9 Outline Design

Many of VolkerRail's projects will have a degree of outline design within them. For instance an OLE renewal will often have the renewals OLE Form A complete but will need an outline design undertaking for the civils element. Likewise a signalling project may have the signalling discipline complete to GRIP 4 but will need telecoms, civils and power completing. The project team must therefore establish which disciplines are at which GRIP stages.

Civils design (including Track) will use Forms F001 & F002 from Network Rail/Client standard NR/L2/CIV/003 for this stage of the design process.

Track Design will use Forms TEF3220 from Network Rail/Client standard NR/L2/TRK/2500 for this stage of the design process.

Telecoms design will use a Form A from Network Rail/Client standard NR/SP/TEL/30022 for this stage of the design process.

Power and OLE design will use a Form A from Network Rail/Client standard NR/L2/ELP/27311 for this stage of the design process.

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5.3.10 Checking

The design shall be thoroughly checked by the designer prior to being issued to the CRE, who will make his own checks of the documentation and the checking sheets. Once the CRE is happy with the submission and signs it off, it can be issued to the client using an appropriate document control system.

The submission for outline design shall demonstrate the following key items:

- The scheme complies with the client’s remit – see also section 5.2.3.
- The overall design concept and appearance is appropriate for its purpose, location and site conditions.
- Adequate height & stagger surveys, geotechnical investigations, load monitoring etc. have been, or will be undertaken.
- The appropriate loadings are being used in accordance with the standards and the work scope.
- The scheme will not result in unsatisfactory constraints on the operational railway.
- That CDM regulations are clearly adhered to and demonstrable.
- Information which the project team will need to identify and manage the remaining significant project specific risks
- Constructability review to identify non-standard installation practices and the requirement for staged detail design submissions.

The submission should be issued in accordance with the Submission section of this standard.

The outline design submission (or similar) may not be accepted, in which case the client will provide documentation to that effect and the submission will be revised and reissued. This process may, in exceptional cases, be repeated more than once.

Outline design drawings will be clearly marked to describe the form with which they are issued i.e. ‘FORM A ISSUE’ or ‘APPROVAL IN PRINCIPLE ISSUE’ or ‘STATEMENT OF DESIGN INTENT’.

These drawings should not be issued to construction teams.

5.3.11 Detailed Design

Detailed design will commence on receipt of a Network Rail/Client Endorsed Approval in Principle. Detailed design will normally be in line with GRIP Stage 5. In some instances the client will dictate that a project specific methodology for the approval of a design will be required. This may not necessitate the need for NR/L2/CIV/003 or NR/L2/INI/27311 forms.

Detailed design will continue the concept of the endorsed approval in principle providing complete clarity for all aspects of the proposal and shall incorporate any comments raised by the client during the approval of the outline design. The design shall specifically consider the following:

- Constructability
- Maintenance
- Operation
- Demolition
- Sustainability

Consultation should take place with all other disciplines associated with the scheme in accordance with the ‘Inter-Disciplinary Check’ section of this standard.

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Risk assessments shall be documented giving consideration to construction, impact of the operational railway, access, maintenance and demolition/decommissioning. In accordance with the CDM Regulations 2015, the designer must consider all elements of significant hazards throughout the life of the designed item i.e. through construction, maintenance and demolition.

In addition to assessing significant hazards, a longer term perspective is also required in terms of assessing the sustainability of a design. All assessments must be made by a competent person using specialist resource where required.

Checking shall take place in accordance with the checking section of this standard.

The CRE shall have visibility of the check sheets, which will confirm that due diligence has been paid to the scheme, prior to signing the design.

All signatures shall be either wet 'original' signatures or scanned copies of the wet signature. Under no circumstances shall electronic signatures be inserted into documentation.

The submission should be issued in accordance with the Submission section of this standard.

The detailed design submission (or similar) may not be accepted, in which case the client will provide documentation to that effect and the submission will be revised and reissued. This process may, in exceptional cases, be repeated more than once.

Detailed design drawings will be clearly marked 'DETAILED DESIGN ISSUE'.

5.3.12 Inter-Disciplinary Checks (Railway System Integration)

Inter-disciplinary check meetings are to be scheduled in the programme following the understanding of how the submissions are to be delivered. Meeting invites for all IDCs are to be issued by the Design Manager at the earliest opportunity. All CREs must acknowledge the design and provide comments as appropriate. These shall be recorded by the CEM in accordance with NR/L2/INI/02009.

5.3.13 Inter-Disciplinary Review

On completion of the design and submission for review, the documents will be subject to an Inter-Disciplinary Review (IDR) by NWR. This review will take place to ensure that the design proposed integrates with any designs for adjoining or associated projects, and any infrastructure proposals and development plans. The review will be multi-disciplinary and not functional, with representatives for all the relevant NWR engineering disciplines for the project, project management and sponsors in attendance.

Should any part of the submitted scheme design be found to be incompatible with the railway system or other proposals in the locality, then this issue should be fed back to the Design Manager who will consider the development of a solution to the issue with the designer.

The IDR will be included in the scheme programme to follow the final IDC. Invites will be issued by the NWR DPE at the earliest opportunity to ensure there is suitable representation at the meeting.

5.3.14 Temporary Works

Temporary works shall be designed to the requirements of the construction team and the Contractor's Responsible Engineer. Detailed design of the temporary works shall be produced and may include calculations, specifications, drawings in support of the forms detailed in NR/L2/CIV/003. The design shall be fully integrated with the permanent design, with statutory bodies' plant and with the temporary works schedule.

Checking shall take place prior to the signature of the forms detailed in NR/L2/CIV/003, all in accordance with the design check categories defined in NR/L2/CIV/003. A written record of the check shall be provided by the checker in all instances as per the checking section of this document.

The CRE shall have visibility of the check sheets, which will confirm that due diligence has been paid to the scheme, prior to signing the design.

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The temporary works submission may not be accepted, in which case the client will provide documentation to that effect and the submission will be revised and reissued. This process may, in exceptional cases, be repeated more than once.

The staging of the installation may necessitate further works which are to be considered at GRIP Stage 6.

5.3.15 Submissions

Submissions shall be made from the Design Team to VolkerRail. Assurance checks for completeness shall be undertaken prior to the CEM authorising the submission for issue to the client.

The component parts of the submission such as drawings, risk assessments and forms shall be individually recorded in a document register by the Design Manager or other person responsible for document control. They are to be stored on the shared drive.

All submissions shall be accompanied with an IDC certificate and a Certificate of compliance on which the CEM shall detail non-compliances.

5.3.16 Construction Drawings

Construction drawings shall commence on receipt of a Network Rail/Client endorsed Certificate of Design and Checking. Comments from the detailed design shall be encompassed along with further detail where appropriate for the construction or installation process.

The drawings shall be clearly marked 'FOR CONSTRUCTION' and signed off by the CEM in accordance with NR/L2/INI/02009.

During the construction phase, design discrepancies may be identified. These discrepancies shall be recorded and actioned by the CRE. The CRE and design team should be made aware of the discrepancies through formal feedback and ensure that repeat mistakes are avoided. The Technical query process can be used to formalise queries.

5.4 Close

5.4.1 As Built Drawings

As built drawings shall be based on 'red line drawings' i.e. those that have been checked and marked up against the actual constructed or installed works. They shall be clearly marked 'AS BUILT' and have the date recorded.

6. DOCUMENTATION (OUTPUTS)

- ENG/01/M002/F01 – Sub-Contracted Design Start Up Meeting Agenda
- ENG/01/M002/F02 – Sub-Contracted Design Project Risk Register

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