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Level 2

Engineering Assurance of Building and Civil Engineering Works

Endorsement and Authorisation

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User information

This standard contains colour-coding according to the following Red–Amber–Green classification.

Red requirements – *No deviations, could stop the railway*

- **Red requirements shall** always be complied with and achieved.
- Red requirements shall be presented in a red box with the word "shall" or expressed as a direct instruction.
- Accountability for the efficacy of red requirements lies with the Professional Head/Standard Owner.
- Red requirements are monitored for compliance.
- Corrective actions shall be enforced if deviations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Amber requirements – *Controlled deviations, approved risk analysis and mitigation*

- **Amber requirements shall** be complied with unless deviation has been approved in advance.
- Amber requirements shall be presented with an amber sidebar and with the word "shall" or expressed as a direct instruction.
- Accountability for the efficacy of these requirements lies with the Professional Head/Standard Owner, or their nominated Delegated Authority.
- Amber requirements are monitored for compliance.
- Deviations **may** be permitted. Deviations are approved by the Standard Owner or through existing Delegated Authority arrangements.
- Corrective actions shall be enforced if **non-approved** deviations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Green – *Guidance*

- Guidance is based on good practice. Guidance represents supporting information to help achieve Red and Amber requirements.
- Guidance shall be presented with a dotted green sidebar and with the word "should" (usually in notes) or as a direct instruction.
- Guidance is **not mandatory** and is not monitored for compliance.
- Alternative solutions may be used. Alternative solutions do not need to be formally approved.
- Decisions made by a competent person to use alternative solutions should be backed up by appropriate evidence or documentation.

Issue record

Issue	Date	Comments
1	October 2001	Supersedes RT/CE/P/003
2	February 2004	Supersedes RT/CE/S/003 Issue 1
3	June 2011	Updated to reflect changes to the organisation and streamlining of Technical Approval procedure.
4	June 2012	Editorial edits to eliminate typographical errors, improve clarity and capture feedback gained from the briefing out process and usage of Issue 3.

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 1st September 2012.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

Reference documentation

Network Rail standards

NR/L2/EBM/STP001	Network Rail standards management - Process requirements
NR/L2/INI/02009	Engineering management for projects
NR/L2/INI/CP0047	Application of the Construction Design and Management Regulations to Network Rail Construction Works
NR/L2/INI/CP0069	Route requirement management and engineering remit production
NR/L1/INI/PM/GRIP/100	Governance for Railway Investment Projects (GRIP) - Policy
NR/L3/CIV/006	Handbook for the examination of structures
NR/L3/CIV/151	Engineering Assurance of Standard Designs and Details for Building and Civil Engineering Works

Forms associated with this standard

NR/L2/CIV/003/F001	Approval in Principle
NR/L2/CIV/003/F002	Statement of Design Intent
NR/L2/CIV/003/F003	Certificate of Design and Check
NR/L2/CIV/003/F004	Architectural and layout acceptance
NR/L2/CIV/003/F005	Certificate of fitness to be taken into use
NR/L2/CIV/003/F006	Roads/Highways Authority Agreement to Bridgeworks
NR/L2/CIV/003/F1990	Technical Design Requirements for BS EN 1990
NR/L2/CIV/003/F1991	Technical Design Requirements for BS EN 1991
NR/L2/CIV/003/F1992	Technical Design Requirements for BS EN 1992
NR/L2/CIV/003/F1993	Technical Design Requirements for BS EN 1993
NR/L2/CIV/003/F1994	Technical Design Requirements for BS EN 1994
NR/L2/CIV/003/F1997	Technical Design Requirements for BS EN 1997

Other references

New Roads and Street Works Act 1991

The Construction (Design and Management) Regulations 2007 (SI No. 320)

Technical Approval of Highway Structures (Design Manual for Roads and Bridges: Department for Transport

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Contents

1 Purpose

The purpose of this standard is to define the engineering assurance requirements for the Design and Construction of Works undertaken on Building and Civil Engineering infrastructure.

2 Scope

This standard applies to the following types of Works undertaken on B&C infrastructure (including Building Services) owned, or to be owned, by Network Rail.

1 Enhancements.

2 Replacements.

3 Repair Works - except where the Design of these is incorporated into the PRS (or similar specification provided by the Asset Manager) and there is no plan to appoint a Designer for implementation.

4 Emergency Works.

5 Temporary Works to facilitate the construction of permanent Works or staged construction, or to provide access for examination and inspection - and where the Temporary Works could have the same impact on the infrastructure as permanent Works.

This standard applies to Works undertaken by Network Rail on B&C infrastructure (including Building Services) owned by an Outside Party. The standard also applies to the Works undertaken on Outside Party infrastructure that is on, over or under Network Rail's infrastructure and where the Outside Party does not have an equivalent procedure to that defined in **5** (of this standard) for those Works. The procedure defined in the *Technical Approval of Highway Structures* is considered to be equivalent.

Network Rail has no power to enforce the requirements of this standard on Works undertaken on Outside Party infrastructure which lies entirely outside Network Rail's infrastructure - whether or not such Works could affect railway operations. For such Works, reasonable endeavours can be followed to apply the requirements of this standard or to obtain confirmation from the Outside Party that there is an equivalent procedure to that defined in **5** in place. Where an Outside Party follows the requirements of this standard, it is acceptable to use documents that are equivalent to the Sponsor's Instruction, PRS and CR-T, and modified versions of the Forms associated with this standard.

This standard does not apply to:

1 Consents or approvals from bodies outside Network Rail including;
- regulatory and statutory authorities
- planning, listed building and conservation authorities

- environmental agencies
- land and property owners or leaseholders
- statutory undertakers and other public services and utilities owners.

2 Obtaining approvals for the New Roads and Street Works Act.

3 Obtaining approval from other Network Rail engineering disciplines for the equipment carried by ESS (such as for signal sighting and reduced clearances), or for the performance of that equipment.

4 Non-structural aspects of Building Works (other than Building Services) - such as the general layout, means of escape, architectural fixtures and finishes - unless the PRS requires such aspects to be covered through the submission of NR/L2/CIV/003/F004.

5 Assessments of structures.

3 Roles and responsibilities

Asset Manager
The Asset Manager is accountable for the management of Building and Civil Engineering infrastructure, and is responsible for producing the PRS (or similar specification) and providing Approval in Principle of the Single Option.

Project Engineer (Building and Civil Engineering)
The PE (B&C) is appointed in accordance with NR/L2/INI/02009: *Engineering management for projects*, and is responsible for (a) the Building and Civil Engineering aspects of the Project, and (b) for following the requirements of this standard, including Acceptance of the Engineering Deliverables.

Contractor's Responsible Engineer
The role of the CRE extends to both the design and construction phases of a Project. The CRE is accountable for the day-to-day management and co-ordination of the technical and engineering activities within a specific engineering discipline for a specific Contract. The CRE is appointed in accordance with NR/L2/INI/02009 and is (a) authorised to sign the Forms associated with this standard on behalf of the design and/or contracting organisation, and (b) responsible for confirming that the Engineering Deliverables satisfy the requirements of the Contract and also meet the requirements of this standard.

4 Definitions and abbreviations

Acceptance (of Engineering Deliverables)
Acceptance that the PE (B&C) is satisfied that:

1 The Deliverables have been checked and approved by the design organisation in accordance with this standard and with NR/L2/INI/02009.

2 Appropriate standards and/or design criteria have been used.

3 An appropriate review has been carried out, based on an agreed risk level, to support the declaration by the CRE that the Deliverables comply with the specified requirements.

Approval in Principle (of the Single Option)
Approval signifies that the Asset Manager is satisfied that the design solution identified is the preferred option for achieving the objectives of the Project and the PRS.

Approved for Construction
A Design that has been prepared, checked and approved in accordance with the Contract requirements and relevant standards - including NR/L2/INI/02009.

Building and Civil Engineering (B&C) infrastructure
The infrastructure for which Network Rail's Professional Head (B&C) is responsible for providing technical support.

Building Services
Apparatus and equipment used to provide ventilation, heating and cooling, lighting, plant, gas, water, power and drainage to a building.

Checker
The person, appointed in accordance with NR/L2/INI/02009, who is authorised to sign NR/L2/CIV/003/F003 on behalf of the checking organisation.

Construction Work
Activities defined as 'construction work' in the Construction (Design and Management) Regulations and NR/L2/INI/CP0047. The term excludes inspection and examination activities.

Contractor's Responsible Engineer (CRE)

Contract Requirements - Technical (CR-T)
The technical requirements included in implementation contracts. The CR-T can include additional Engineering Deliverables to those produced to support the Approval in Principle of the Single Option. The term also refers to requirements that are specified for in-house delivery.

Design
A Design comprises the drawings, layout and connection details, specifications and bill of quantities (including the specification of articles or substances) relating to the Works, and calculations undertaken to support these items.

Design Check
A check of a Design to confirm its adequacy. The Design Check is carried out by an independent Checker, and includes verifying compliance with the CR-T.

Designer
The CRE appointed in accordance with NR/L2/INI/02009 and who is authorised to sign, on behalf of the Design Organisation, NR/L2/CIV/003/F001*;* F002*;* and F003.

Emergency Work
Work carried out as part of an immediate response to an incident, and which restores the fitness for purposes of railway operations and/or infrastructure.

Engineering Deliverables
Designs, specifications, reports, certificates, data, and other information that fulfil the requirements of the PRS.

Enhancement
Works delivered through a Project that change the operational capability of the infrastructure.

Equipment Support Structures (ESS)
Structures whose function is to support and provide access to signalling, telecommunication, power equipment, etc.

Hidden Part
A primary structural member that cannot be observed from at least one side throughout its extent and which is not protected by a material that can preserve its condition.

Outside Party
An organisation, other than Network Rail, that is an infrastructure owner or developer, or a user or occupier of Network Rail's infrastructure. The term includes highway authorities, passenger transport executives, public or private developers, and train operating companies.

Project Engineer (Building and Civil Engineering): **PE (B&C)**

Project Requirements Specification (PRS)
A technical specification of engineering requirements produced by the Asset Manager and issued to the delivery organisation by the Sponsor as part of the Sponsor's Instruction.

Repair Work
Planned work that requires reinstatement of the components of a structure, but which does not result in a permanent change to the general form of that structure or a permanent reduction of the structure gauge or standard of safety. The term includes;

- like-for-like repairs and replacement of components,
- repair and replacement of components in similar or generally accepted equivalent materials provided that such substitution does not affect the integrity or performance of the structure, and
- 'good housekeeping' activities such as cleaning, painting, pointing, removal of harmful vegetation from structures, and clearing mud and silt from watercourses.

Replacement
Works that involve the replacement of a structure (or part of one) where there is no change to the functionality of that structure.

Sponsor's Instruction
The formal document from the Sponsor that describes the objectives for each stage of a Project and details the services to be provided by the Project Manager.

Taken into Use
The state of new, altered, or renewed infrastructure or Temporary Works (whether complete or not) when fit for (as applicable) the safe passage of trains; occupation by users; use of or passage by members of the public; and installation of plant or equipment.

Temporary Works
Structures or staging works that enable construction work to be carried out and which are removed or become redundant before the completion of the permanent Works. Temporary Works include;

- existing structures subjected to a temporary load which is higher than that normally experienced by the structure,
- access scaffolding and falsework,
- temporary structures that provide access for inspection and/or examination only,
- excavations,
- demolition - where this not part of the Project Works, and
- partially completed structures which are subjected to substantial temporary loads.

5 Procedure

5.1 Project phases

In sequence, **5.2** to **5.8** define the acceptance procedures for:

1 Sponsor's Instruction for development.

2 Approval in Principle of the Single Option.

3 Updating the Sponsor's Instruction for Implementation.

4 Contract Requirements -Technical.

5 Design.

6 Design Check.

7 Verification and entry into service.

In following these procedures, reference should be made to the GRIP stages defined in NR/L1/INI/PM/GRIP/100: *Governance for Railway Investment Projects (GRIP) - Policy*.

5.2 Sponsor's Instruction for development

A Sponsor's Instruction shall be prepared for each Project. The Instruction shall include the PRS (produced in accordance with NR/L2/INI/CP0069: *Route requirement management and engineering remit production* and include the requirements specified by the Asset Manager.
The Instruction and PRS should be issued at the start of GRIP 2 and be updated as required during the lifecycle of the Project.

5.3 Approval in Principle of the Single Option

With some exceptions, described below, Design work shall not commence prior to the granting of Approval in Principle of the Single Option - as regulated through NR/L2/CIV/003/F001. Where this Form is required for the Works, no change to the configuration of the infrastructure shall take place until Approval in Principle has been granted.

Form NR/L2/CIV/003/F001 shall be submitted by the PE (B&C) to the Asset Manager for signed Acceptance when a Project has developed to a stage that a Single Option has been determined and the PRS requirements have been defined. This Form shall also be signed by the PE (B&C) and the CRE of the Design organisation.

Where more than one B&C discipline is involved, signed Approval shall be obtained from Asset Managers in each of those disciplines.
Depending on the scale and complexity of the Project, it might be necessary to submit separate NR/L2/CIV/003/F001 for (for example), (a) structural Works, and (b) the provision of Building Services.

Where an Interdisciplinary Review is required, it shall be prepared in accordance with NR/L2/INI/02009 prior to the submission of the NR/L2/CIV/003/F001 to the Asset Manager.

The following information shall be provided as part of or in addition to the NR/L2/CIV/003/F001:

1 In A1.2, details of the Design criteria that are not covered in current standards, and criteria that are not normally used or are maintenance choices that have not been specified by the Asset Manager.

2 In A1.2, as required, references to the *Technical Design Requirements Forms* (NR/L2/CIV003/F1990 to F1997) and the decisions on the options selected for applying the suite of Structural Eurocodes.

3 In A1.3, details of anticipated deviations to standards and the justification for these: where necessary, these shall be agreed by the Professional Head (B&C). Formal approval for all deviations shall be obtained prior to submission of the NR/L2/CIV/003/F003.

4 Details of Hidden Parts that are to be retained - including
a. in A1.6; a justification for their retention, investigations undertaken (or required to be undertaken) to determine their condition, and proposed remedial works to them, and
b. in A1.7 arrangements for the visual observation of these (in accordance with NR/L3/CIV/006: *Handbook for the examination of structures*) and/or alternative techniques for verifying their structural integrity.

5 Details of Hidden Parts that will be introduced by the Works - including
a. in A1.6, a justification for their introduction, and
b. in A1.7, arrangements for the visual observation of these (in accordance with NR/L3/CIV/006: *Handbook for the examination of structures*) and/or alternative techniques for verifying their structural integrity.

A copy of the details of all Hidden Parts shall be provided in an readily useable format (such as through as-built drawings) to the Asset Manager. (Details of Hidden Parts that are not available at the time of the submission of the NR/L2/CIV/003/F001 shall be provided as part of or in addition to the NR/L2/CIV/003/F002.)

6 In A1.8, the Design Check Category as proposed by the PE (B&C).

7 Supporting evidence for the selection of the Single Option - this shall include the items required by the PRS.

A completed NR/L2/CIV/003/F001 remains valid for three years provided that construction works begins within that time.
Where construction work has not started within that time then, unless agreed otherwise by the relevant Asset Manager(s), a new Form shall be submitted: such agreements shall be recorded by the Asset Manager(s).

Approval in Principle is not required for the following types of Works;

- Repair Works,
- Emergency Works,
- Temporary Works, and
- those where the Design requires either a Category 0 or Ia Design Check (see **5.7**).

Where the selection of Design Check Category 0 has been accepted by the Asset Manager (as confirmed in the PRS) it is permissible for the Design to proceed without a NR/L2/CIV/003/F002 or NR/L2/CIV/003/F003.
In such cases, in addition to the normal signatories, the CRE and the PE (B&C) shall sign off the Approved for Construction documents prior to their issue.
Design Check Category 0 is not appropriate for Designs that deviate from the requirements of Network Rail standards or Railway Group Standards.

5.4 Updating of the Sponsor's Instruction for implementation

Where a Sponsor's Instruction is to be updated to take account of a PRS for implementation, reference to the requirements of the approved NR/L2/CIV/003/F001 shall be included in that update.

For a Design requiring a Check Category III where there is an absence of standards or where guidance is required for the interpretation of standards, the Asset Manager shall consult the Professional Head (B&C) to define the requirements for inclusion in the PRS for implementation.

5.5 Contract Requirements - Technical

The CR-T shall include the necessary deliverables to support the contracting strategy.
The PE (B&C) is responsible for aligning the requirements of the CR-T with those specified in the PRS.

5.6 Design

The basis of the Design of the Works (or a specific part of them) shall be defined within the NR/L2/CIV/003/F002.

Form NR/L2/CIV/003/F002 shall be submitted by the CRE to the PE (B&C). The PE (B&C) should have provided signed acceptance of the Form prior to the start of the Detailed Design stage.

Where necessary, the Design of Building Services (for example) shall be integrated with other parts of the Design through an Interdisciplinary Check process in accordance with NR/L2/INI/02009.

A single NR/L2/CIV/003/F002 may be submitted where a Design is used repetitively for a generic group of ESS or similar groups of structures/services.

Where, for example due to the Contractor's delivery strategy, the Design of a particular structure is split into parts, the submissions shall be integrated through the appointment of a lead Designer and Checker. They shall submit single NR/L2/CIV/003/F002 and NR/L2/CIV/003/F003 for the Project.

The following information shall be provided in addition to or as part of NR/L2/CIV/F002.

1 In 1.2, staging of the Works. This shall include details of the proposed stages and associated method of working and, where applicable, demonstrate the structural adequacy and inter-compatibility of new, altered, and existing structures at all stages of Construction.

2 In 1.3, as required, reference to the *Technical Design Requirements Forms* (NR/L2/CIV003/F1990 to F1997) and the decisions on the options selected for applying the Structural Eurocodes.

3 In 1.5, details of the deviations to standards: the process defined in NR/L2/EBM/STP001: *Network Rail standards management - Process requirements* shall be followed.

4 The aspects applicable to the Design; this shall be done by striking through the non-applicable items given in the Design Checklist.

5 The nature and extent of parts/elements of existing structures/services that are to continue in use in association with new construction. This shall show how the suitability of these parts/elements for continuing use has been, or will be, addressed.

6 Where necessary (see points 4 and 5 of **5.3**),

a. in A1.6, additional details of Hidden Parts that will be retained or introduced through the Design, and

b. in A1.7, arrangements for the visual observation of these (in accordance with NR/L3/CIV/006: *Handbook for the examination of structures*) and/or alternative techniques for verifying their structural integrity.

A copy of the details of all Hidden Parts shall be provided in an readily useable format (such as through as-built drawings) to the Asset Manager.

7 The use of previously-designed structural parts/elements: a copy of the engineering assurance documents for these shall be appended.

8 The use of Standard Designs and Details - as defined in NR/L3/CIV/151: *Engineering Assurance of Standard Designs and Details for Building and Civil Engineering Works.*

Where the PE (B&C) identifies deviations from the PRS, the appropriate Asset Manager shall review, amend (where necessary) and accept the deviations described in NR/L2/CIV/003/F002 (PART 5).
In such cases, the Asset Manager may request the resubmission of NR/L2/CIV/003/F001 to take account of changes to the PRS.

Where the PRS requires the submission of NR/L2/CIV/003/F004, the Form shall be submitted in accordance with the stated requirements.

The requirements of this Clause (**5.6**) shall be applied to the Design of Temporary Works whose failure or presence could affect the safety of the railway or the safety of any persons other than those under the control of the construction organisation.

5.7 Design Check

5.7.1 Fundamental requirements

The Design submission shall be prepared to a sufficient level of detail to allow it to be issued as Approved for Construction. The submission shall include the drawings, schedules, performance, materials, workmanship specifications, testing and inspection plans, CDM risk registers, and other documents that form the Design.

Form NR/L2/CIV/003/F003 shall be submitted by the CRE. This shall confirm that the Design has been (a) carried out in accordance with NR/L2/CIV/003/F002, and (b) checked in accordance with the agreed Design Check Category. In addition, the CRE shall confirm the matters that have been considered in the Design Check by completing the Design Checklist that forms part of NR/L2/CIV/003/F003.

5.7.2 Check Category

The Design Check Category should be in accordance with Table 1 but where it is apparent that a higher Check Category is appropriate, the PE (B&C) may amend the Category in the NR/L2/CIV/003/F002.

Category	Type of Designs	Method of Checking
0	Designs for which calculations are not required, and the Design can be adequately checked by inspection. Designs shall meet the requirements of Network Rail standards and Railway Group Standards. Designs for which, although simple calculations can be required, the consequences of failure would not be significant.	No additional requirements.
Ia and Ib	Standard or simple Designs using simple methods of analysis and where all aspects of Design are in accordance with relevant standards. Assemblies of elements or components which have themselves been designed and checked and/or accepted.	The Design may be checked in the same Design team but by staff other than the Designers. The Checker may refer to the Design calculations and the assumptions on which the calculations are based. The Checker shall consider the Designer's assumptions to be valid.
II	Designs not in Categories 0, I or III.	The Design may be checked in the same organisation as that which prepared the Design. Checking shall be undertaken in a group or team that has not been concerned with the development of the Design.
III	Complex or unusual Designs, or which involve significant departures from current standards, novel methods of analysis or considerable exercise of engineering judgement.	The Design shall be checked by an organisation independent of the Design organisation (that is, by an organisation which is a separate legal entity).

Table 1: Design Check Categories

Examples of Check Categories for different types of Works are given in Appendix **A**.

Except where permitted in Table 1, the Design Check shall be carried out without reference to the Design calculations.

Designs carried out by a Design organisation appointed by the Construction organisation to provide Design services should be checked at the levels shown in Table 1.

Table 1 shall be used with the following revisions;

- Category I Designs shall be checked as Category II Designs,
- Category II Designs shall be checked as Category III Designs,

where the Design;

1 is for a new generic Standard Design and Detail for incorporating into NR/L3/CIV/151, or

2 is delivered by an organisation contracted by Network Rail to deliver both Design and Construction and the Design organisation and Construction organisations are not separate legal entities, or

3 is for an Outside Party.

5.7.3 Category III Design Check

When the PE (B&C) has identified that the method of Design is novel, the Checker shall not use the same method for completing the Design Check as used in the Design, but shall use recognised methods for the Check.

Where possible, Category III Checkers shall use different software to those used by the Designers: the PE (B&C) shall be advised where this is not feasible.

The PE (B&C) shall be provided with a Design Check statement that describes the proposed methodology for completing the Design Check.

The Design Check statement shall:

- describe the method of analysis to be used (including the use of computer-based methods),
- define the programme for the Design Check (including interfaces with the Designer), and
- state how compliance with the requirements of the Design Check will be achieved.

5.8 Verification and entry into service

Before any significant part of the permanent or Temporary Works for a Project are Taken into Use, Form NR/L2/CIV/003/F005 for those Works shall be signed by the CRE (or their nominated representative).

When required by the PE (B&C), the CRE shall identify any necessary materials and commissioning tests required to verify that the Works is compliant with the Design.

When the Work is carried out during periods when normal train operations are suspended or when other means of maintaining the safety of the operational railway are utilised, and such Work is to be Taken into Use (whether the permanent Works are completed or not), the completed NR/L2/CIV/003/F005 shall be provided to the person responsible for the provision of access within 3 metres of the track.

6 Alterations to the Design

Alterations to a Design which materially affect the statements made in a NR/L2/CIV/003/F002 shall lead to a resubmission of that Form.
This will also require a resubmission of the NR/L2/CIV/003/F003 (where it is in place).

Where reasonably practicable, a proposed change to a Design shall not be implemented until a revised version of NR/L2/CIV/003/F002 for the change has been accepted by Network Rail.
Other Design Changes shall be undertaken using the change control process set out in NR/L2/INI/02009.

When significant changes to a Design are necessary during possessions or at other times where it is impracticable for the Design change to be accepted by Network Rail before implementation, the Design change shall be reviewed by the PE (B&C), and any additional mitigation measures agreed and put into place before the works are Taken into Use. In such cases, the Design change shall be checked, and a revised version of NR/L2/CIV/003/F003 reissued with the Design to Network Rail for acceptance within 3 days of the Works (permanent or Temporary) being Taken into Use.

7 External stakeholders

7.1 Public Road, Bridleway, Footpath Bridges, and Outside Party structures

When the Works affect (a) a bridge carrying a public road, bridleway or footpath, and/or (b) an Outside Party structure, the agreement of the relevant road/highway authority or structure owner shall be obtained and recorded at the Approval in Principle stage.
For bridges carrying a public road, bridleway, or footpath, this may be done by submitting Form NR/L2/CIV/003/F006 to the road/highway authority (for their signed approval).

7.2 Leased structures

When the Works affect a Station, Depot or other Network Rail property leased to a train or freight operating company or other organisation, where possible the comments of the company or organisation shall be requested and included in the submission of NR/L2/CIV/003/F001.

Appendix A Design Check Categories

A1 Applicability of Forms

The applicability of the Forms to the various Design Check Categories is described in Table A1.

Form	Applicable stage	Design Check Category
NR/L2/CIV/003/F001: *Approval in Principle*	Upon selection of single option	Ib, II, III
NR/L2/CIV/003/F002: *Statement of Design Intent*	Prior to start of Detailed Design	Ia, Ib, II, III
NR/L2/CIV/003/F003: *Certificate of Design and Check*	At completion of Detailed Design	Ia, Ib, II, III
NR/L2/CIV/003/F005: *Certificate of fitness to be taken into use*	Prior to entry into service	0, Ia, Ib, II, III

Table A1: Applicability of Forms

A2 Selection

The following indicates the Design Check Category that is generally applicable for the types of Works listed.
In all cases, however, appropriate engineering judgement shall be exercised when selecting the Category.

It is assumed in the listing that the following apply: average soil conditions; conventional types of construction; and normally accepted serviceability criteria. Consideration shall be given to elevating the Category where any of the following apply;

- soil conditions are unusual, and/or the soil has a low strength or high compressibility,
- the type of construction is unusual,
- deflections are critical, such as when the proposed Works are adjacent to an existing track or structure.

For many Works with Design Check Category 0 (particularly where calculations are not done), a suitable Work Package Plan can be sufficient to describe and control the design parameters (general form, materials, clearances etc).

The use of Standard Designs and Details shall be in accordance with NR/L3/CIV/151.

Permanent Works

Category 0

Emergency works that are determined without Design calculations
Surface car parks (unless extensive)
Drainage works that do not require hydraulic design
Earth-retaining structures with a retained height not exceeding 600 mm and in locations (such as the toe of a cutting) where their failure would not obstruct the passage of trains
Fencing, security palisade fencing, safe cess walkways
Painting
Waterproofing of bridge decks
Brickwork re-pointing
The superstructure of modular platforms (for supporting lineside equipment) that are to be installed according to the manufacturer's recommendations (foundations are categorised separately)

Category Ia

Bespoke designs of the superstructure of modular platforms (for supporting lineside equipment) supported on spread footings on natural undisturbed ground
Platforms less than 3.5m wide supported on spread footings on natural undisturbed ground
Bespoke buildings of two storeys or less with one plan dimension of 6.0m or less, and which are supported on spread footings
Emergency Works determined with Design calculations
Structures with a span of 5.0m or less, and which can be built without requiring a possession

Signalling

Superstructures: straight post, signal post, OLE mesh, bespoke elevated structure (LOC platform, SPT walkway), speed sign post, ground position light signal, level crossing elements, gallows structure for banners
Foundations: spread foundations for the above superstructures and REB, URX, undertrack crossings
Earth-retaining structures with a retained height not exceeding 1m

Telecoms

Superstructures: brackets supporting telecom display units, gallows structure for OFF Indicator or for NTI
Foundations: spread foundations to the above superstructures, DOO camera column, or DOO monitor stacked housing

Electrification

Spread concrete foundations (bases) supporting DNO, auxiliary transformer, mobile generator, PSP, points heating cubicle, points heating transformer, points heating terminal box, functional supply point

Category Ib

Bridge superstructure whose Design is based closely on one previously certificated with Design Check category II or III (that is, one with no more than minor modifications)
Single span simply-supported slab or deck-type bridge superstructures with a span not exceeding 15m and a skew not exceeding 20º
Footbridges of conventional construction with a span not exceeding 20m
Portal structures of conventional construction with a span not exceeding 20m
Culverts of conventional construction
Reinforced concrete box culverts with a span not exceeding 6m
Gravity earth-retaining walls with a retained height not exceeding 5m
Soil stabilisation works involving toe weighting, sheet piling or bored piles
Station platforms on level or near-level ground, or in cuttings
Single-storey buildings and platform canopies of conventional construction
Drainage works that require hydraulic design

Category II

Works not in Design Check Category 0, I or III

Category III

Bridges and other structures with a high degree of redundancy
Bridges with a span exceeding 50m
Bridges with a skew exceeding 45º or lead exceeding half the span except

- where the Design is based closely on a Design previously certificated Design Check Category III (that is one with no more than minor modifications)
- for simply-supported torsionally-flexible types of bridge decks - such as half-through girders with a steel floor

Bridges and other substantial structures with difficult foundation conditions
Complex, unusual or innovative geotechnical works (including cutting or embankment stabilisation Works through difficult ground conditions)
New tunnels
Substantial Works in existing tunnels or tunnel shafts (other than conventional lining works - such as the replacement of a brick ring or the spraying of concrete)
New and altered structures with non-standard loading conditions
Where the Design involves consideration of the aerodynamic effects of trains travelling at speeds greater than 125mph
Works which include structural features or characteristics that have not previously been used and which will be subject to railway live loading
Other Works that the Asset Head, Asset Manager, Project Engineer, or Professional Head (B&C) consider to be in Design Check Category III

Temporary Works

Category 0

Proprietary falsework systems or access towers used in accordance with the manufacturer's recommendations
Temporary pedestrian edge protection to excavations etc. for use only by persons under the control of the construction organisation

Ground support for scaffolding, access towers, small crane lifts and the like where loading is modest and the substrate is competent

Minor unsupported (vertical-sided or battered) excavations, including

- normal service trenches
- other excavations up to about 1 square metre in plan (where subject to railway or road vehicular live loading not exceeding about 600mm in the direction of traffic)

Category Ia

Proprietary previously-designed road vehicle bridge or footbridge superstructure systems used at the rated loading, and used in accordance with the manufacturer's recommendations

Single-level propped soil-retaining structures

Cantilever soil-retaining structures with a retained height not exceeding 3m

Reinforced soil structures with a retained height not exceeding 3m

Temporary level crossings

Demolition of single-span arch bridges

Temporary pedestrian edge protection to excavations etc. for public use

Tube-and-fitting scaffolding supported on the ground, not more than 6m high and not spanning more than 3m

Category II

Multi-level-propped soil-retaining structures

Anchored soil-retaining structures up to 6m retained height

Cantilever soil-retaining structures with a retained height not exceeding 6m

Reinforced soil structures with a retained height not exceeding 6m

Shield-driven tunnels up to 4.5m diameter

Jacked undertrack structures up to 6m span

Temporary station platforms

Temporary road vehicle bridges and footbridges (other than proprietary superstructure systems as given for Category I)

Tube-and-fitting scaffolding not supported on the ground (e.g. suspended from a structure), and/or more than 6m high and/or spanning more than 3m

Demolition of multi-span arch bridges

Category III

Temporary track alignments

Temporary bridges carrying rail traffic

Structures that exceed the limits for Design Check Category II

Other Works that the Asset Head, Asset Manager, Project Engineer, or Professional Head (B&C) consider to be in Design Check Category III

Category Ia, II or III (to be determined on a site-specific basis)

Ground support/foundations for; large crane lifts, proprietary road vehicle bridge, footbridge superstructure systems, temporary bridges carrying rail traffic, other temporary structures

Unsupported (vertical-sided or battered) excavations that exceed the limits for Design Check Category 0

Temporary Works at risk of impact by road vehicles or construction traffic

Building Services (Permanent or Temporary Works)

Category 0

Like-for-like building renewals whose design/arrangements are based on National Building Regulations (for example) - so that they do not require a detailed Design - and which do not affect the kinetic envelope or clearances to trains

Category Ia or Ib

Where the Design is undertaken to *The Chartered Institute of Building Services Engineers Guides*, or a similar national building specification approved by the Asset Head

Category II

Works not in Design Check Category 0, I or III

Category III

Other Works that the Asset Head, Asset Engineer, Project Engineer, or Professional Head (B&C) consider to be in Design Check Category III.

Standards Briefing Note

Ref: NR/L2/CIV/003	**Issue:** 4
Title: Engineering Assurance of Building and Civil Engineering Works	
Publication date: 02/06/2012	**Compliance date:** 01/09/2012
Standard Owner: Professional Head (B&C), Asset Management (B&C)	
Non-Compliance rep (NRNC): Senior Policy Development Specialist, Asset Management (B&C)	
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Purpose:

The purpose of this standard is to define the Engineering Assurance requirements for the design and construction of works undertaken on Building and Civil Engineering infrastructure.

Scope:

This standard applies to the following types of Works undertaken on B&C infrastructure (including Building Services) owned, or to be owned, by Network Rail

1 Enhancements.

2 Replacements.

3 Repair Works - except where the design of these is incorporated into the PRS (or similar specification provided by the Asset Manager) and there is no plan to appoint a Designer for implementation.

4 Emergency Works.

5 Temporary Works to facilitate the construction of permanent Works or staged construction, or to provide access for examination and inspection - and where Works could have the same impact on the infrastructure as permanent Works.

This standard applies to Works undertaken by Network Rail on B&C infrastructure (including Building Services) owned by an Outside Party. The standard also applies to the Works undertaken on Outside Party infrastructure that is on, over or under NR's infrastructure and where the Outside Party does not have an equivalent procedure to that defined in the standard.

What's New/ What's Changed and Why:

A number of editorial changes have been made to improve the clarity of text and to address issues raised through the extensive briefing out process undertaken for the previous issue (3) of this standard. Such changes include corrections to the text to cover (a) the Design Check category for Temporary Works, and (b) references to the *Technical Design Requirements* for the suite of structural Eurocodes. In addition, text has been incorporated from NR/BS/LI/189: *Additional requirements relating to hidden parts*.

The improved clarity of text will reduce the number of queries on the standard, and improve its application.

Affected documents:

Reference	*Impact*
NR/L2/CIV/003 ISSUE 3	Superseded
NR/BS/LI/189 ISSUE 1	Withdrawn

Briefing requirements: *Where Technical briefing (T) is required, the specific Post title is indicated. These posts have specific responsibilities within this standard and receive briefing as part of the Implementation Programme. For Awareness briefing (A) the Post title is not mandatory.*

Please see http://ccms2.hiav.networkrail.co.uk/webtop/drl/objectId/09013b5b804504da for guidance.

Briefing *(A-Awareness/ T-Technical)*	**Post**	**Team**	**Function**
A	Route Asset Managers (Structures, Buildings, Geotechnics, Civils)	Route Asset Management teams (B&C)	Asset Management (B&C)
A	Head of B&C Programmes; Head of Civils Asset Management (Structures); Programme Manager; Senior Compliance Management Engineer; Structures Management Engineer	Central Asset Management (B&C)	Asset Management (B&C)
A	Senior Project Engineers, Senior Programme Engineers, Senior Design Engineers, Programme Engineering Managers, Programme Engineers, Project Engineers, Principal Design Engineers, Design Engineers & Assistant Project Engineers, Principal Project Engineer - FTN, Principal [Structures] Design Engineer - Crossrail	All Buildings and Civils teams	Investment Projects

**NOTE: Contractors are responsible for arranging and undertaking their own Technical and Awareness Briefings in accordance with their own processes and procedure*