



Engineering Recommendation G81 Part 7

Issue 2 2016

Framework for contestable diversionary and reinforcement works not exceeding 33 kV

Part 7 Contestable diversionary and reinforcement works

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**Operations Directorate
Energy Networks Association
6th Floor, Dean Bradley House
52 Horseferry Rd
London
SW1P 2AF**

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Amendments since publication

Issue	Date	Amendment
1	2007	First issue
1 + A1	2008	Amendment 1: Reference to ENA Engineering Recommendation G70 replaced with ENA Technical Report 136. Reference to ENA Engineering Recommendation L38/1 replaced with L38. Reference to Electricity and Pipe Line Works (assessment of environmental effects) Regulations removed. Reference to Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations, changed to refer to the document amended in 2007. Reference to Electricity Safety Quality and Continuity Regulations 2002, changed to refer to document amended in 2006.
2	2016	Minor revision to reflect changes in the Ofgem Competition in Connections regime and updating of reference publications and legislation. This issue includes the following principal technical changes. Clause 2: Deleted those publications already stated in EREC G81 Parts 1-6 and added statement that: "These references supplement those already set out in EREC G81 Parts 1-6, which must also be applied." Added reference to ENA TS 43-122, ER G80, ER L44. Deleted HSE, Pooling & Settlement and Ofgem agreed publications not mentioned in main body of document.

		<p>Clause 4 Legislation: Deleted legislation already stated in EREC G81 Parts 1-6 and added statement that: "These Acts and Regulations supplement those already set out in EREC G81 Parts 1-6, which must also be met." Added equivalent Control of Pollution (Oil Storage) Regulations for Northern Ireland and Scotland and Conservation of Habitats and Species Regulations 2010.</p> <p>Clause 5.1 General: Added variations caused by "...network design and impact on fault levels".</p> <p>Clause 7 Overhead line Works – Specific requirements: Reworded heading and requirements to make reference to specific requirements. Reworded requirement to "shall" in relation to information required to be submitted by the Applicant prior to the start of construction activity. Changed "closing" energising connection to "final".</p> <p>Clause 8 Design and planning: Rewording such that ratings of diverted OHL match the rating of the newly installed contested circuit to which it is directly connected, where the rating is greater than that of the existing circuit.</p> <p>Clause 9 Provision of materials: Deleted requirements that are already stated in Parts 2 and 5 (to avoid duplication). Incorrect reference to Part 4 changed to Part 5.</p> <p>Clause 10: Installation and records: New clause added requiring compliance with EREC G81 Parts 3 and 6 for installation and records. Reference to CDM Regulations changed from "2007" to "2015". Details of all other technical, general and editorial amendments are included in the associated Document Amendment Summary for this Issue (available on request from the Operations Directorate of ENA).</p>
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Foreword

This Engineering Recommendation (EREC) is published by the Energy Networks Association (ENA) and comes into effect from date of publication. It has been prepared under the authority of the ENA Engineering Policy and Standards Manager and has been approved for publication by the ENA Electricity Networks and Futures Group (ENFG). The approved abbreviated title of this engineering document is “EREC G81 Part 7”.

This EREC replaces and supersedes ER G81 Part 7 2008 (as amended).

This document is a “qualifying standard”, being listed in Appendix 2 of The Distribution Code, and has been revised under the governance of the Distribution Code Review Panel and in association with the Ofgem Electricity Connections Steering Group.

EREC G81 is a suite of engineering documents that sets out a national framework to facilitate competition in new connections. EREC G81 Parts 1-3 are associated with low voltage (LV) housing development installations and associated new HV/LV distribution substations. EREC G81 Parts 4-6 are associated with commercial and industrial connections and associated new HV and HV/LV distribution substations. This part is associated with contestable diversionary and reinforcement works on underground cables and overhead lines not exceeding 33 kV and on HV/LV distribution substations.

Since ER G81 was last amended in 2008 the contestability of connection work has been extended to include jointing of metered and unmetered supplies to existing low voltage mains cables and to jointing of high voltage mains cables¹. In addition, a significant number of references in the documents have been superseded and new references relevant to EREC G81 have been published. These changes and resultant changes to requirements are captured in this revision. The opportunity has been taken to align the document with the current ENA engineering document template and ER G0 governing the rules for structure, drafting and presentation of ENA engineering documents.

This document is intended to be used by Independent Connection Providers (ICPs) and Independent Distribution Network Operators (IDNOs) that undertake new connections under the Ofgem Competition in Connections regime.

Where the term “shall” or “must” is used in this document it means the requirement is mandatory. The term “may” is used to express permission.

NOTE: Commentary, explanation and general informative material is presented in smaller type, and does not constitute a requirement.

If there are queries about this document please discuss them with the Host Distribution Licence Holder (Host DLH) in whose area it is proposed that work is to be undertaken. In the event that it is not possible to resolve the question with the Host DLH, please seek advice from the Connections Policy Team, Ofgem, 9 Millbank, London SW1P 3GE.

¹ See Ofgem decision letter dated 8 May 2012 [1].

1 Scope

This document sets out design and planning, materials specification requirements, and installation and records requirements for contestable diversionary and reinforcement works on underground cables and overhead lines not exceeding 33 kV and associated distribution substations undertaken under the Ofgem Competition in Connections regime.

The following suite of documents set out requirements that also apply to elements of contestable diversionary and reinforcement work.

- Adoption Agreement².
- Design and planning framework (EREC G81 Parts 1 & 4).
- Materials specifications framework (EREC G81 Parts 2 & 5).
- Installation and records framework (EREC G81 Parts 3 & 6).
- Underground unmetered connections framework.

This Part of EREC G81 serves to amplify and extend requirements in these documents to contestable diversionary and reinforcement works that fall within the scope of EREC G81 Part 7. As such, this Part must be read in conjunction with EREC G81 Parts 1 to 6, as their content is not duplicated here.

NOTE: This suite of documents applies only to new installations and is not to be applied retrospectively.

This document set outs and makes reference to requirements which have to be met for a Host DLH to adopt contestable diversionary or reinforcement works.

Within the scope of this document, the dismantlement of existing Host DLH assets and the design of reinforcement works are non-contestable.

This document supplements but not amend, abridge or override any statutory legislation referred to within this document.

2 Normative references

The following referenced documents, in whole or part, are indispensable for the application of this document and must be complied with unless otherwise agreed in writing with the Host DLH. The latest editions of these documents including all addenda and revisions shall apply unless otherwise agreed with the Host DLH. These references supplement those already set out in EREC G81 Parts 1-6, which must also be applied.

NOTE: It is not appropriate to cross-reference all relevant requirements from the following publications in this document. Where a publication is not specifically cross-referenced in the main clauses of this document then all relevant requirements are deemed to apply.

Standards publications

BS 7870-5, *LV and MV polymeric insulated cables for use by distribution and generation utilities. Polymeric insulated aerial bundled conductors (ABC) of rated voltage 0.6/1 kV for overhead distribution*³

² Also known as "Agreement to Adopt".

³ BS 7870-5 to be applied subject to certain amendments/additions/deletions in ENA TS 43-13.

BS 7884, *Specification for copper and copper-cadmium stranded conductors for overhead electric traction and power transmission systems*

BS EN 50182, *Conductors for overhead lines. Round wire concentric lay conductors*

Energy Networks Association publications⁴

ENA TS 09-20, *Single core cables having cross linked polyethylene insulation and lead sheath for rated voltage 19 000/33 000 volts ($U_m = 36 000$ volts)*

ENA TS 43-8, *Overhead line clearances*

ENA TS 43-12, *Insulated aerial bundled conductors erection requirements for LV overhead distribution systems*

ENA TS 43-13, *Aerial bundled conductors (ABC) insulated with cross-linked polyethylene for low voltage overhead distribution⁵*

ENA TS 43-14, *Conductor fittings and associated apparatus for use with LV aerial bundled conductors*

ENA TS 43-15, *Insulator binds and equivalent helical fittings for overhead lines*

ENA TS 43-30, *Low voltage overhead lines on wood poles*

ENA TS 43-40, *Specification for single circuit overhead lines on wood poles for use at high voltage up to and including 33 kV*

ENA TS 43-88, *Selection and treatment of wood poles and associated timber for overhead lines*

NOTE: ENA TS 43-88 Parts 1 and 2 have now been superseded by ENA TS 43-88 Issue 5.

ENA TS 43-90, *Anti-climbing measures and safety signs for high voltage overhead lines*

ENA TS 43-91, *Stay strands and stay fittings for overhead lines*

ENA TS 43-92, *Overhead line fittings*

ENA TS 43-93, *Line insulators*

ENA TS 43-95, *Steelwork for overhead lines*

ENA TS 43-103, *Low voltage overhead line temporary shrouding materials*

ENA TS 43-117, *Installation of aluminium current carrying overhead line conductor fittings*

ENA TS 43-119, *Design and use of temporary scaffold guards*

ENA TS 43-120, *Fittings for covered conductors for overhead lines (having rated voltages U_o/U greater than 0.6/1 kV up to and including 19/33 kV)*

⁴ ENA documents can be obtained via the ENA web site: www.energynetworks.org.

⁵ ENA TS 43-13 to be read in conjunction with BS 7870-5.

ENA TS 43-121, *Specification for single circuit overhead lines of compact covered construction on wood poles for use at high voltage up to and including 33 kV*

ENA TS 43-122, *XLPE covered-conductors for overhead lines (having rated voltages U_0/U greater than 0.6/1 kV up to and including 19/33 kV)*

ENA TS 43-123, *Performance criteria for fall prevention/fall arrest devices for use on poles whilst ascending and descending*

ENA TS 43-125, *Design guide and technical specification for overhead lines above 45 kV*

ER G55/2, *Safe tree working in proximity to overhead lines*

ER G80, *Recommendations for the safe working of utilities' staff and other parties near light rapid transit systems*

ER L38, *Overhead line conductors – Protection against corrosion by the application of anti-corrosion grease during manufacture*

ER L44, *Separation between wind turbines and overhead lines: Principles of good practice*

ETR 132, *Improving network performance under abnormal weather conditions by use of a risk based approach to vegetation management near electric overhead lines*

ETR 136, *Vegetation management near electricity equipment – principles of good practice*

Health & Safety Executive (HSE) publications

GS 6, *Avoiding danger from overhead power lines*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

Applicant

company wishing to undertake the contestable work

3.2

BS

British Standard

3.3

BS EN

European Standard adopted as a British Standard

3.4

BSI

British Standards Institution

3.5

CDM

Construction (Design and Management) Regulations 2015

3.6

Distribution Licence Holder (DLH)

Holder of an Electricity Distribution Licence defined in Electricity Act 1989 Standard conditions of the Electricity Distribution Licence

NOTE: Host DLH refers to the Distribution Licence Holder for the public electricity network concerned.

3.7
Distribution Service Area (DSA)
service area of a DLH

3.8
ENA
Energy Networks Association

3.9
ENA TS
Energy Networks Association Technical Specification

3.10
Engineering Recommendation (ER or EREC)
engineering document published by the ENA, whose title may be abbreviated to ER or EREC

NOTE: Engineering Recommendations published from 2012 onwards are generally referred to as ERECs.

3.11
ESQCRs
Electricity Safety, Quality and Continuity Regulations 2002 (as amended)⁶

3.12
Harmonised Document (HD)
IEC Standard adopted as a European reference document

3.13
Host DLH
DLH in whose licensed area (DSA) the works are to take place

3.14
HV
high voltage exceeding 1 000 V a.c.

NOTE: See Clause 1 for HV limit that applies to this document.

3.15
IEC
International Electrotechnical Commission

3.16
LV
low voltage not exceeding 1 000 V a.c.

3.17
NRSWA
New Roads and Street Works Act

3.18
Ofgem
Office of Gas and Electricity Markets

⁶ And associated Guidance documents issued by DTI (now BIS) including URN 06/1294 [1].

3.19

Point of Connection (POC)

point on the existing Host DLH network to which new assets will be connected

3.20

TMA

Traffic Management Act 2004

4 Legislation

All requirements of all relevant legislation must be met. The following is a list of some of the relevant legislation. These Acts and Regulations supplement those already set out in EREC G81 Parts 1-6, which must also be met.

- a) Control of Pollution (Oil Storage) (England) Regulations 2017.
- b) Countryside and Rights of Way Act 2000.
- c) Conservation of Habitats and Species Regulations 2010.
- d) National Parks and Access to the Countryside Act 1949.
- e) National Parks (Scotland) Act 2000.
- f) Nature Conservation (Scotland) Act 2004.
- g) Traffic Management Act 2004.
- h) Water Environment (Oil Storage) (Scotland) Regulations 2006.

5 General

This document is subject to some local variation between DLHs because, for example, of differences in:

- substation specification, network design and fault levels;
- environment and impact on ratings, insulation, corrosion etc.;
- compatibility with existing equipment.

Where a deviation from this document is identified, it will be stated in the DLH Appendices to this document.

6 Programming

It is important that the Applicant and Host DLH discuss and agree at an early stage the programme of work relating to:

- a) approval of the Applicant's detailed design proposal, e.g. electrical, layout, civil, physical etc. (as applicable);
- b) Wayleaves/easements and construction access;
- c) materials approval;
- d) installation/inspections;

⁷ For equivalent Regulations in Northern Ireland refer to The Control of Pollution (Oil Storage) Regulations (Northern Ireland) 2010 (as amended); there are no equivalent Regulations in Wales.

- e) outage programming, including requirements for other diversionary works and final connection into the existing system;
- f) provision of records;
- g) DLH dismantlement of redundant assets.

The Adoption Agreement shall include provision to refresh and update the programme.

Where the diversionary work entails work in the highway, it is important to establish responsibilities at the outset for submission of streetworks notices including any need for long term advance notice in certain classifications of highway. The Adoption Agreement will need to cover NRSWA [and TMA] costs including notices, penalties and long term liabilities, such as for reinstatement works.

7 Overhead line works – Specific requirements

There are many interactions and interdependencies between the elements of line routing, design, consents, wayleaving and construction that are unique to overhead line work. This can lead to significant contractual complexity and difficulty, if not properly co-ordinated, which is in the interest of no party. Consequently, contestable work will, unless otherwise agreed, only be divided into ‘pre-construction activity’ and ‘construction activity’, with all elements within the “bundle” being undertaken by a single party. Where an environmental impact assessment is required, this might form part of wider study, e.g. a wind farm, and responsibility for undertaking it shall be agreed between the parties.

Pre-construction activity:

- Initial indicative route selection from exit point to POC.
- Identification of Landowners and Tenants on initial route.
- Liaison with Landowners and Tenants for permission to survey.
- Detailed on-site survey.
- Liaison with Parish & Local Planning Authorities, Statutory Consultees, local interest groups etc.
- Discussion with other utilities.
- Detailed design and profile of new overhead line to be agreed with Host DLH.
- Compliance with ESQCR risk assessment requirements to be agreed with Host DLH (typically route, clearances, anti-climbing guards, additional notices, other physical protection and ongoing clearance to vegetation).
- Application for planning consent (e.g. Forms 10b or Transport and Works Act Order).

Construction activity:

- Arranging permanent and temporary diversionary works of other assets/utilities to permit line construction.
- Preparation of Safety Plan under CDM.
- Land access arrangements for construction materials storage and temporary site accommodation, if required.
- Protection of road crossings and other obstacles.
- Construction.
- Handling of claims and compensation payments for access and land damage.

Where the Applicant is undertaking the pre-construction activity, the Host DLH shall state the applicable loading criteria for the design (wind load, ice accretion etc.), together with its policy on surge arresters in the Host DLH Appendix A to this document.

The Applicant shall submit the following to the Host DLH and shall obtain agreement from the Host DLH prior to the start of construction activity.

- a) Design for the contested work.
- b) Method statement for construction including maximum stringing tensions and means of controlling these.
- c) ESQCR risk assessment.
- d) Proposed list of materials and suppliers.

The design of the contested work shall be such that its construction does not encroach on safety and working access clearances to existing operational Host DLH assets. Whilst the final energising connection is non-contestable, the design of the contested line will have an impact on the work necessary to complete that final connection. Consequently, it is necessary to establish at the outset:

- a) the final span configuration; and
- b) responsibilities in relation to provision and removal of temporary stays and for sagging (which might entail sagging of a section of the contested work).

Contested work shall not take place within the third party clearances stated in HSE GS6 (see 3) unless otherwise agreed with the Host DLH.

Pre-commissioning inspection of the overhead line by the Host DLH shall include a walking inspection to confirm correct signage is in place (i.e. Danger of Death, support numbering etc), construction conforms to agreed design clearances, and anti-climbing guards are in place.

The following 'as erected' records for the contested works should be provided to the Host DLH by the Applicant in the format(s) agreed with the Host DLH.

- a) Route plan.
- b) Line Profile.
- c) Wayleave agreements and easements.

NOTE: The format may include Computer Aided Design software formats.

8 Design and planning

8.1 Diversionary works

The design of the diversion shall be such as to maintain the rating of the existing circuit or match the rating of the newly installed contested circuit to which it is directly connected, where the rating is greater than that of the existing circuit. Further requirements included in EREC G81 Parts 1 and 4 shall also apply.

The Host DLH may elect to opt for a design which exceeds the requirements for the minimum scheme diversion, for example to provide additional LV linking facilities or to increase conductor sizing, to permit later network extension not covered by the Applicant's programme. If there are generic issues such as provision of mobile generator connection facilities, these will generally be set out in the Host DLH specific Appendices.

Issues which are relevant to individual designs will be discussed with the Applicant during the design process, as provided for under the terms of the Adoption.

8.2 Reinforcement works

The design of reinforcement works is non-contestable. Where contestable reinforcement works are to be undertaken by the Applicant, the Host DLH will provide the design to enable the Applicant to work up a proposal covering materials, installation, records and programme etc. for agreement with the Host DLH.

The Host DLH may elect to opt for a design which exceeds the requirements for the minimum scheme reinforcement, for example to provide additional LV linking facilities or to increase conductor sizing, to permit later network extension not covered by the Applicant's programme. Issues which are relevant to individual designs will be discussed with the Applicant during the design process, as provided for under the terms of the Adoption.

8.3 Dismantlement works

The dismantlement of existing Host DLH assets associated with diversionary or reinforcement works is non-contestable.

9 Provision of materials

Specification and procurement of all new materials and equipment for contestable diversionary and reinforcement works shall follow the arrangements/requirements set out in EREC G81 Parts 2 and 5.

10 Installation and records

Installation, inspection, testing (e.g. pre-commissioning testing) and provision of records associated with contestable diversionary and reinforcement works shall follow the arrangements/requirements set out in EREC G81 Parts 3 and 6.

Appendix A (normative)

Data specific to Host DLH – Typical example

This is an example of the type of data that would be inserted into Appendix A by the Host DLH and is included only for indicative purposes

NOTE: The Host DLH may cross-reference other internal documents containing technical requirements, which will be made available to the Applicant.

Overhead line wind load	[units]	(Clause 7)
Overhead line ice load..... (or ENA TS 43-40 classification).....	[radial mm] [e.g.4C]	(Clause 7)
Conductor types, sizes and maximum stringing tensions...	[list]	(Clause 7)
Policy on use of surge arresters		(Clause 7)

Bibliography

Other publications

[1] *Guidance on the Electricity Safety, Quality and Continuity (Amendment) Regulations 2006*, Publication reference URN 06/1294, Department for Trade and Industry (now Department for Business, Innovation & Skills).

