

Design Manual for Roads and Bridges



Road Lighting
Maintenance & Operation

TM 501

Road lighting maintenance

(formerly TD 23/99)

Revision 0

Summary

This document contains the requirements for the maintenance and operation of new and replacement road lighting on motorways and all-purpose trunk roads.

Application by Overseeing Organisations

Any specific requirements for Overseeing Organisations alternative or supplementary to those given in this document are given in National Application Annexes to this document.

Feedback and Enquiries

Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

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Release notes

Version	Date	Details of amendments
0	Mar 2020	TM 501 replaces TD 23/99. This full document has been re-written to make it compliant with the new Highways England drafting rules.

Foreword

Publishing information

This document is published by Highways England.

This document, alongside TS 501, replaces TD 23/99 Trunk Roads and Trunk Road Motorways Inspection and Maintenance of Road Lighting which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This document contains the maintenance and operation road lighting requirements of the Overseeing Organisation.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 3.N] apply to this document.

Maintenance of other highway systems can complement, and be carried out in conjunction with, road lighting maintenance. These systems include illuminated signs, bollards, etc. and can be integrated into their maintenance activities.

Abbreviations

Abbreviations

Abbreviation	Definition
DNO	Distribution Network Operator

Terms and definitions

Terms

Term	Definition
As-built drawings	Revised set of drawings submitted by the installer or maintainer reflecting all changes made in the specifications during the maintenance process. Also known as "as installed" drawings.
Asset management system	An electronic database which contains information and data covering road lighting systems, as well as other assets, and includes data on inspections, testing, maintenance, schedules and rectification of defects, as well as identifiers.
Feeder pillar	A cabinet for electrical equipment, mounted at roadside, for controlling and distributing electrical supply to roadside assets.
Lamp	A replaceable component of the luminaire or lighting system that, when connected to electricity, produces light.
Luminaire	A complete lighting unit consisting of a lamp or lamps together with the parts designed to distribute the light, to position and protect the lamps, and to connect the lamps to the power supply.
Preventative maintenance	A planned, recurrent intervention.
Road lighting column	A standalone minor structure with the purpose of mounting a luminaire or luminaires.
Road lighting system	<p>An installation of equipment and parts, including electrical energy, that are integrated and coordinated to create a method to illuminate the road.</p> <p>Road lighting systems are inclusive of but not restricted to:</p> <ol style="list-style-type: none"> 1) luminaires; 2) Belisha beacons and vertical wig wag signs at school or animal crossings; 3) road lighting columns; 4) road traffic sign lighting; 5) access lighting for subways, underpasses and short tunnels (<150 m in length), for motorised users, pedestrians, cyclists and horse riders; 6) the electrical and optical elements of high mast lighting systems (20 m or more in height) and catenary lighting systems; 7) associated electrical supplies, including ducting, chambers, cables and feeder pillars and all switch gear, control equipment (including the photocell if fitted), monitoring equipment and heaters therein; 8) alternate energy sources for the purpose of road lighting or sign lighting; 9) energy saving equipment, e.g. dimming equipment; 10) power distribution cables downstream of the Distribution Network Operator (DNO) connection point.
Safeguarding solution	A device or system fitted to columns and luminaires to prevent detachment of the luminaire from the column.

1. Scope

Aspects covered

- 1.1 This document outlines road lighting system maintenance requirements that shall be implemented through maintenance and response to operational failures on motorways and all-purpose trunk roads with the exception of tunnel lighting.
- 1.2 The requirements in this document shall be implemented for columns $\leq 18\text{m}$ in height with luminaires mounted on brackets and $\leq 20\text{m}$ in height with post-top mounted luminaires.
- 1.3 All other road lighting columns, catenary systems and high masts, including associated hoists, winches and cables shall be maintained in accordance with CS 450 [Ref 2.N], SI 1998/2307 [Ref 4.N] and manufacturer's recommendations.

Implementation

- 1.4 This document shall be implemented forthwith on all schemes involving road lighting equipment maintenance on the Overseeing Organisations' motorway and all-purpose trunk roads according to the implementation requirements of GG 101 [Ref 3.N].

Use of GG 101

- 1.5 The requirements contained in GG 101 [Ref 3.N] shall be followed in respect of activities covered by this document.

2. Maintenance

General maintenance

2.1 Potential defects or risks that can impact on safety, customers or the performance of the asset shall be mitigated through preventative maintenance.

2.1.1 Preventative maintenance interventions should be scheduled and prioritised to meet asset and customer needs by sustaining the availability, safety, performance, operation, reliability and longevity of our physical assets.

NOTE *Appropriate preventative maintenance brings benefits of reduced whole of life costs, and improved customer service through lower network occupancy requirements.*

2.2 The maintenance and operation for all electrical works shall comply with the requirements of BS 7671 [Ref 5.N].

2.3 Elements of the road lighting system that require maintenance shall be notified to the Overseeing Organisation.

2.4 Overgrown vegetation shall be removed from all sites, columns and feeder pillars, and tree pruning carried out, following liaison with the arboriculture officer of the Overseeing Organisation to ensure clear and safe access.

2.5 Painted lighting columns and feeder pillars shall be repainted in accordance with:

- 1) paint manufacturer's recommendations and specifications; or
- 2) any agreed repainting schedule; or
- 3) when inspections show that repainting is necessary.

2.6 While maintaining the road lighting system, observed defects to any other equipment, assets and property shall be reported to the Overseeing Organisation and recorded in the asset management system.

Luminaire maintenance

2.7 Lamps for road lighting shall be replaced in accordance with manufacturer's recommendations and specifications.

2.8 Electronic drivers, controllers and ballasts shall be replaced in accordance with manufacturer's recommendations and specifications.

2.9 The external optical surfaces of luminaires shall be cleaned during all maintenance activities.

2.10 Each lamp shall be indelibly marked with the date of installation.

NOTE *Marking lamps with the date of installation aids date identification for purposes such as warranty issues.*

2.11 All locks, catches and hinges associated with the luminaire shall be lubricated in accordance with manufacturer's recommendations and specifications.

2.12 Luminaire fixings shall be checked and tightened to the torque setting recommended by the manufacturer with the luminaire at the correct alignment.

2.12.1 Luminaire fixings should include:

- 1) spigot bolts;
- 2) luminaire body retaining bolts;
- 3) safeguarding solution fixtures if fitted.

2.13 During maintenance activities, an inspection for visual defects of all luminaire components, casings, welds and safeguarding solutions shall be made, and any visual defects found reported to the Overseeing Organisation.

- 2.13.1 Where visual defects are found during maintenance activities, the subsequent inspection results should be reported to the Overseeing Organisation.

Lighting column maintenance

- 2.14 The base compartment of the lighting column shall be kept clean and clear of debris.
- 2.15 As part of the lighting column maintenance, lighting columns shall be inspected for any structural or mechanical defects, in accordance with ILP GN22 [Ref 1.N].
- 2.16 All screws, bolts and fixed components associated with lighting columns, including signs, internal electrical components, etc, shall be checked and tightened, to the torque setting recommended by the manufacturer.
- 2.17 Road lighting column references and approved notices that are damaged or illegible shall be replaced.

Network cabling

- 2.18 Distribution Network Operator (DNO) supply is subject to Electricity Supply Regulations and faults shall be reported to the DNO SI 2001/3263 [Ref 6.N].
- 2.19 Private network cabling shall be maintained in accordance with BS 7671 [Ref 5.N].
- 2.20 Circuit protective devices shall be checked for correct rating and replaced where defective.

NOTE The correct rating can be found within the health and safety file.

Feeder pillars

- 2.21 Feeder pillars shall be structurally and electrically maintained to ensure operational integrity according to manufacturer's instructions.
- 2.22 Feeder pillar thermostats and heaters, where installed, shall be checked for adjustment to 5°C and that the heater is operational.
- 2.23 Within the feeder pillar, an up to date as-built electrical wiring schematic and layout drawing shall be available.
- 2.24 The external and internal surfaces of the feeder pillar shall be cleaned in accordance with manufacturer's recommendations and specifications.
- 2.25 All locks, catches and hinges associated with the feeder pillar shall be lubricated in accordance with manufacturer's recommendations and specifications.
- 2.26 All electrical terminations associated with the feeder pillar shall be cleaned, tightened and renewed as necessary in accordance with manufacturer's specifications.
- 2.27 All electrical switchgear associated with the feeder pillar shall be maintained for safe electrical and mechanical operation in accordance with the manufacturer's instructions.

Defects

- 2.28 All road lighting system defects shall have a failure category applied in accordance with ILP GN22 [Ref 1.N].
- 2.29 All defects shall be repaired, by adopting either a category of failure approach or a risk based approach.
- 2.30 Where a category of failure approach is in use, the response times given in Appendix A shall be used.
- 2.31 Where a risk based approach is in use, the Overseeing Organisation shall be contacted.

Operational requirements

Equipment referencing

- 2.32 Lighting columns and feeder pillars shall be identified by a unique reference that is clear and visible.

2.33 Lighting column and feeder pillar references shall be replaced if damaged or missing.

Records, inventory and asset management data

2.34 All defects associated with road lighting systems identified during maintenance work shall be reported and recorded, including details of any action taken or required, in accordance with the asset management system.

2.35 All as-built drawings associated with road lighting systems shall be kept up to date.

2.36 A road lighting system's digital inventory shall be maintained and made available to the Overseeing Organisation on request.

2.36.1 The inventory should be updated to provide information, to include electricity power supply reports, for electricity procurement and maintenance management, on a monthly basis with a maximum of 3 months between updates.

2.36.2 The inventory should be stored, using commercially available software, on a computer system which is able to output records in a format agreed by the Overseeing Organisation.

2.36.3 The integrity of the inventory should be maintained through back-up facilities and procedures operated on a regular basis.

2.37 The road lighting systems inventory shall include data to:

- 1) satisfy the requirements for the procurement of electricity;
- 2) support the effective maintenance of road lighting systems; and
- 3) provide information to support maintenance strategy and policy.

3. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Institute of Lighting Professionals. ILP GN22, 'Asset Management Toolkit: Minor Structures AToMS'
Ref 2.N	Highways England. CS 450, 'Inspection of highway structures'
Ref 3.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 4.N	The National Archives. legislation.gov.uk. SI 1998/2307, 'Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) '
Ref 5.N	BSI. BS 7671, 'Requirements for Electrical Installations, IET Regulations'
Ref 6.N	legislation.gov.uk. SI 2001/3263, 'The Electricity (Unmetered Supply) Regulations 2001'

Appendix A. Category of defects and response times

Table A.1 Category of defects and response times

Category of defect	Description	Maximum response time	Additional actions
Category 1	A defect which can result in a structural or electrical safety hazard to the public or maintenance personnel	24 hours	None
Category 2 (High and medium priority)	A defect which results in lighting that is below the quality intended	Urban trunk roads: 7 days Other roads: 14 days	The DNO should be notified of any supply failures within 24 hours
Category 3 (Low priority)	All other electrical defects, lighting failures and structural faults which are considered to be less critical	6 months	Repairs should be incorporated into planned works, wherever practicable. Defects identified as requiring large scale replacement in schemes which are considered to be at the end of their useful life should be reported to the Overseeing Organisation.
The times quoted are the maximum response times between notification of the defect to the contractor and the repair being completed			

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Road Lighting
Maintenance & Operation

TM 501

England National Application Annex to TM 501 Road lighting maintenance

(formerly TD 23/99)

Revision 0

Summary

This National Application Annex gives the Highways England requirements related to road lighting maintenance.

Feedback and Enquiries

Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

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Release notes

Version	Date	Details of amendments
0	Mar 2020	Highways England National Application Annex to TM 501.

Foreword

Publishing information

This document is published by Highways England.

This document supersedes TD 23/99, which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This National Application Annex gives the Highways England requirements related to road lighting maintenance.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 2.N] apply to this document.

E/1. Risk based approach requirements

- E/1.1 Where road lighting system and associated equipment defects are identified and a risk based approach is being used, the defects shall be repaired in accordance with the asset delivery asset maintenance requirements in GM 701 [Ref 1.N].

E/2. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. GM 701, 'Asset delivery asset maintenance requirements'
Ref 2.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'

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Design Manual for Roads and Bridges



Road Lighting
Maintenance & Operation

TM 501

Northern Ireland National Application Annex to TM 501 Road lighting maintenance

(formerly TD 23/99)

Revision 0

Summary

This National Application Annex gives the Department for Infrastructure Northern Ireland requirements related to road lighting maintenance.

Feedback and Enquiries

Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated team in the Department for Infrastructure, Northern Ireland. The email address for all enquiries and feedback is: dcu@infrastructure-ni.gov.uk

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Release notes

Version	Date	Details of amendments
0	Mar 2020	Department for Infrastructure Northern Ireland National Application Annex to TM 501.

Foreword

Publishing information

This document is published by Highways England on behalf of Department for Infrastructure, Northern Ireland.

This document supersedes TD 23/99, which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This National Application Annex gives the Department for Infrastructure, Northern Ireland requirements related to road lighting maintenance.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 1.N] apply to this document.

NI/1. Risk based approach requirements

NI/1.1 Department for Infrastructure, Northern Ireland shall be contacted for further details related to risk based approach requirements.

NI/2. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
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Road Lighting
Maintenance & Operation

TM 501

Scotland National Application Annex to TM 501 Road lighting maintenance

(formerly TD 23/99)

Revision 0

Summary

This National Application Annex gives the Transport Scotland requirements related to road lighting maintenance.

Feedback and Enquiries

Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Transport Scotland team. The email address for all enquiries and feedback is: TSSStandardsBranch@transport.gov.scot

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Release notes

Version	Date	Details of amendments
0	Mar 2020	Transport Scotland National Application Annex to TM 501.

Foreword

Publishing information

This document is published by Highways England on behalf of Transport Scotland.

This document supersedes TD 23/99, which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This National Application Annex gives the Transport Scotland requirements related to road lighting maintenance.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 1.N] apply to this document.

S/1. Risk based approach requirements

S/1.1 Transport Scotland shall be contacted for further details related to risk based approach requirements.

S/2. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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Road Lighting
Maintenance & Operation

TM 501

Wales National Application Annex to TM 501 Road lighting maintenance

(formerly TD 23/99)

Revision 0

Summary

This National Application Annex gives the Welsh Government requirements related to road lighting maintenance.

Feedback and Enquiries

Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Welsh Government team. The email address for all enquiries and feedback is: Standards_Feedback_and_Enquiries@gov.wales

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Release notes

Version	Date	Details of amendments
0	Mar 2020	Welsh Government National Application Annex to TM 501.

Foreword

Publishing information

This document is published by Highways England on behalf of Welsh Government.

This document supersedes TD 23/99, which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This National Application Annex gives the Welsh Government requirements related to road lighting maintenance.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 1.N] apply to this document.

W/1. Risk based approach requirements

W/1.1 Welsh Government shall be contacted for further details related to risk based approach requirements.

W/2. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
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