Design Manual for Roads and Bridges











Highway Structures & Bridges Design

CD 367 Treatment of existing structures on highways widening schemes

(formerly BD 95/07)

Revision 0

Summary

This document contains the requirements and advice for the treatment of structures on highway widening schemes on motorways and all-purpose trunk roads, and setting out the principles to be applied in the process.

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	CD 367 replaces BD 95/07. 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This document supersedes BD 95/07, which is withdrawn.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

In order to use public funds more effectively, future highways schemes need to make better use of existing roads and associated infrastructure. The widening of highways is an efficient means of achieving this.

Widening gives rise to many issues affecting existing structures. The treatment of these issues can have a major influence on the design and cost of a widening scheme.

This document updates and replaces BD 95/07, containing the requirements and advice for the treatment of structures on highway widening schemes on motorways and all-purpose trunk roads, and setting out the principles to be applied in the process.

A consistent approach is promoted to improve efficiency and avoid unnecessary design and construction work, with the overall aim of achieving better value for money on widening schemes.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 4.N] apply to this document.

Mutual Recognition

Where there is a requirement in this document for compliance with any part of a "British Standard" or other technical specification, that requirement may be met by compliance with the Mutual Recognition clause in GG 101 [Ref 4.N].

Abbreviations

Abbreviations

Abbreviation	Definition
AIP	Approval in principle
RSRF	Record of structural review form CS 451 [Ref 7.N]
SOR	Structures options report

Terms and definitions

Terms and definitions

Term	Definition
Approval in principle	A document in which the design or assessment proposals are outlined for approval.
Departure from standards	Criterion, which departs from, or is an aspect not covered by, the DMRB requirements and other requirements contained in the technical approval schedule.
Latent departure	A non-compliance with a DMRB design, assessment or maintenance requirement associated with an existing structure.
Modified structure	A structure at which the geometry of structural elements is being changed significantly or a structure which is subject to a significant increase in load effect in order to accommodate a widened or re-aligned carriageway.
Overseeing Organisation	The highways authority responsible for motorways and all-purpose trunk roads in England, Scotland, Wales and all designated roads in Northern Ireland.
Record of structural review form	A form on which the decision to accept that an existing assessment or the original design capacity is still valid, is recorded (CS 451 [Ref 7.N]).
Special order vehicle	A special order vehicle that does not conform to the AW SI 1998/3111 [Ref 12.N] or STGO SI 1998/2003 [Ref 11.N] Regulations but is covered by Section 44 of the Road Traffic Act 1988 [Ref 6.N]. In Northern Ireland the equivalent vehicles are covered by Article 60 of the Road Traffic (Northern Ireland) Order 1995 (N.I. Orders No. 2994 (N.I. 18) [Ref 10.N]).
Special types general order vehicle	A special types general order vehicle conforming to the STGO Regulations SI 1998/2003 [Ref 11.N].
Strengthened or upgraded structure	A structure for which the geometry of structural elements is essentially appropriate for the scheme but strengthening/upgrading is proposed as part of the works.
Structures option report	A report which, prior to the preparation of the structure review process documents, summarises the preliminary design proposals for a structure.
Structures review process documents	Documents, such as AIPs, which record the agreed basis and criteria for the detailed design or assessment of a highway structure.
Unaffected structure	A structure which is not being modified and for which no strengthening or upgrading is proposed as part of the scheme. An unaffected structure can be subject to some change in geometry or load but the changes are not deemed significant such that an existing assessment is still valid.
Widening scheme	A scheme involving widening of the existing cross-section of part of the highway network.

1. Scope

Aspects covered

1.1 This document shall be used during the planning, design and construction of works involving the treatment of structures on highway widening schemes.

Implementation

1.2 This document shall be implemented forthwith on all schemes involving the treatment of existing structures on highway widening schemes on the Overseeing Organisations' motorway and all-purpose trunk roads according to the implementation requirements of GG 101 [Ref 4.N].

Use of GG 101

1.3 The requirements contained in GG 101 [Ref 4.N] shall be followed in respect of activities covered by this document.

2. Principles to be adopted in the development of the widening scheme

Structure-highway interface

- 2.1 The loading and geometric criteria for the scheme shall be agreed with the Overseeing Organisation prior to the preparation of the structure options reports (SORs).
- 2.1.1 Each structure should be reviewed individually to determine if the desired cross-section can be achieved, taking account of geometric constraints, accident statistics etc.
- 2.1.2 The benefits of a consistent highway cross-section should be balanced against the cost benefits associated with local variations driven by specific structural and/or site constraints.

Treatment of existing non-compliance

- 2.2 Any structures-related non-compliance with a DMRB assessment or maintenance requirement shall be addressed as part of the scheme.
- NOTE Maintenance requirements are specific DMRB requirements for a performance feature to be maintained during the service life of a structure, e.g. CD 127 [Ref 1.I].
- 2.3 Any known structures-related non-compliance with a DMRB design requirement shall be addressed as part of the scheme if any of the following criteria apply:
 - 1) retaining a non-compliance represents a significant safety risk;
 - 2) the risks associated with the non-compliance are exacerbated by the widening scheme;
 - there is a national policy to upgrade particular elements during major schemes or DMRB design documents include a relevant requirement to be implemented on improvement schemes;
 - 4) based on an assessment of whole life costs, there is a clear case for upgrading, maintenance or even replacement to be carried out as part of the widening scheme;
 - 5) upgrading works at the structure to address the non-compliance are required to be carried out in the short term.
- 2.3.1 A non-compliance may be addressed by:
 - 1) undertaking works to eliminate the non-compliance or;
 - 2) obtaining approval from the Overseeing Organisation to retain the non-compliance through the departures approval system.
- NOTE A widening scheme often presents an opportunity to carry out maintenance, upgrading or strengthening works in a cost effective manner and with minimal further disruption to the road network.
- 2.4 When reviewing existing non-compliances, agreement shall be sought from the Overseeing Organisation regarding:
 - 1) the scope of works;
 - 2) acceptable non-compliance(s);
 - 3) the responsibility for design and construction;
 - 4) the funding for the work.
- 2.4.1 The scope, responsibility and funding of works should be agreed at preliminary design stage with the Overseeing Organisation.
- 2.4.2 Irrespective of whether non-compliances were known about in advance, the principles that should be applied to dealing with them remain the same.
- NOTE Additional non-compliances can become apparent from inspections and/or assessments undertaken as part of the scheme.

Retention of non-compliances

- 2.5 Any proposed retention of non-compliance with a DMRB assessment or maintenance requirement shall require a departure from standards.
- 2.5.1 A non-compliance with DMRB design requirements should not require a departure from standards provided that none of the criteria in 2.3 are applicable.
- 2.6 Details of the retained non-compliances shall be included in a list of latent departures for each individual structure.
- NOTE No departure from standards is necessary in relation to the assessed capacity of a structure for special types general order and special order vehicles.
- 2.7 A departure from standards submission shall be required for non-compliance with the following, regardless of whether the structure is unaffected or requires works to accommodate the scheme:
 - 1) DMRB assessment requirement;
 - 2) DMRB maintenance requirement.
- 2.7.1 In the case of missing assessment documentation, one of the following options should be implemented:
 - 1) a reassessment is carried out;
 - 2) justification for retaining the structure in use is provided to the Overseeing Organisation.
- 2.8 A departure from standards submission shall be required for non-compliance with DMRB design requirements, whether the structure is unaffected or requires works to accommodate the scheme, where any of the criteria in 2.3 are applicable.
- 2.8.1 Non-compliance with DMRB design requirements in unaffected structures may be accepted with no further approval action, where none of the criteria in 2.3 are applicable.
- 2.9 Where the structure requires works to accommodate the scheme and none of the criteria in 2.3 are applicable, non-compliance with DMRB design requirements shall be included in the list of latent departures and submitted to the Overseeing Organisation for review.
- 2.10 Where a departure from standards has previously been approved for a specific issue, a further departure from standards submission for that issue shall only be required where any of the criteria in 2.3 are applicable.
- *NOTE* For example, where the risks at the time the previous departure from standards was approved are increased as a consequence of the scheme.

Replication of a structures related non-compliance

- 2.11 A formal departure from standards submission shall be required in every case of replicating an existing non-compliance in the process of extending or modifying an existing structure.
- NOTE 1 This requirement applies whether the extension or modification works are necessary to accommodate the widening scheme, such as deck widening; or the works are not directly related to the widening, such as deck strengthening.
- NOTE 2 Replicating existing non-compliances can be justified in some circumstances, for example providing new joints to match the existing over intermediate supports.

Modifying, strengthening or upgrading an existing structure

- 2.12 Where a structure is to be modified or a non-compliance is to be addressed, then the modification, strengthening or upgrading shall be designed in accordance with DMRB design requirements.
- 2.13 The existing elements of a modified, strengthened or upgraded structure shall comply with DMRB assessment requirements.

- 2.13.1 The whole structure of a modified bridge should be certified, unless partial certification has been agreed with the Overseeing Organisation, e.g. in the case of isolated strengthening or upgrade works.
- NOTE 1 Where different requirements are applied to the new and existing parts of a bridge, there is potential for it to have varying capacity.
- NOTE 2 In some cases the capacity of the whole bridge is limited by the existing elements. In other cases, heavier loads could be permitted but restricted to particular lanes.
- 2.13.2 Where different parts of a bridge have different capacities, any need to restrict heavier loads to particular lanes should be identified in the assessment report and certificate.

Future inspection and maintenance

- 2.14 Future maintenance and inspection shall be addressed in the development of the proposals.
- 2.15 The means of facilitating future maintenance and inspection shall be recorded in the SORs, and later in the structure review process documents.

Aesthetics and heritage issues

- 2.16 The aesthetics of modified structures shall be designed in keeping with the existing infrastructure and surrounding environment.
- NOTE Guidance on aesthetics of modified structures is provided in CD 351 [Ref 2.I].
- 2.17 Any heritage issues associated with the existing structures shall be addressed in accordance with CG 304 [Ref 3.N].

Redundant structures

2.18 All abandoned or redundant existing structures within the new highway boundary shall be demolished, partially demolished, concrete filled or otherwise made safe in order to remove any maintenance liability and to eliminate any effect on the performance of the network, unless otherwise agreed with the Overseeing Organisation.

3. Clarifying requirements for assessment of existing structures

Structures to be assessed

- 3.1 Unless otherwise agreed with the Overseeing Organisation, structures shall be assessed where there is:
 - 1) no existing assessment or design valid for the proposed treatment of the structure;
 - 2) a change in the design load of the structure;
 - 3) a change in the condition of the structure;
 - 4) a change in legislation or the requirements of the Overseeing Organisation; or,
 - 5) a proposed modification of the structure.
- 3.2 Structures which are being modified in a way which affects their structural behaviour shall require assessment.
- 3.3 Any project-specific requirements or principles to be adopted regarding assessment of structures, including any requirement to assess for special order vehicle loading, shall be agreed with the Overseeing Organisation.

Assessment validity

- 3.4 The validity of an existing assessment (or design) for the proposed condition shall be determined through the completion of a record of structural review form (RSRF) as set out in CD 350 [Ref 9.N].
- 3.5 Reasoning as to why the structure is deemed acceptable without further assessment shall be recorded in the RSRF.
- NOTE It is not necessary to verify the accuracy of the existing assessment.

Assessments standards

- 3.6 Existing structures or existing elements of modified structures shall be assessed to DMRB assessment requirements.
- NOTE Where an existing element complies with DMRB design requirements a check to DMRB assessment requirements is not necessary.

Achieving minimum required capacity

- 3.7 Where a structure is found not to be capable of carrying the proposed loading, one of the following options shall be undertaken, with the agreement of the Overseeing Organisation:
 - 1) carry out further assessment (such as more accurate field measurements, materials testing or more detailed analysis techniques), ref CS 454 [Ref 2.N] for levels of assessment;
 - 2) obtain a departure from standards;
 - 3) carry out strengthening or replacement.
- 3.7.1 Other options to address a failed assessment may be acceptable with the agreement of the Overseeing Organisation.

Assessment for substructure impact and parapet impact

- 3.8 Where the proposed works increase the likelihood or consequences of vehicle/substructure impact, then unless a valid assessment for substructure impact already exists, this particular assessment shall be carried out.
- NOTE An example of a situation which can increase the likelihood or consequences of vehicle/substructure impact is where closer proximity between traffic and the existing piers is proposed as part of the widening scheme.

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- 3.9 Where the substructure fails an assessment in accordance with CS 453 [Ref 8.N] the non-compliance shall be addressed as part of the scheme.
- 3.9.1 The non-compliance may be addressed by undertaking strengthening/protection works or by obtaining approval from the Overseeing Organisation to retain the non-compliance.
- 3.10 Vehicle restraint system provision on a widening scheme shall be determined in accordance with CD 377 [Ref 5.N].
- 3.11 The decision on whether to upgrade or replace parapets shall be determined by undertaking an assessment in accordance with CS 461 [Ref 1.N].
- 3.12 Where a new vehicle restraint system is being installed, an assessment shall be required to verify that the load effects acting on the structure can be accommodated.
- NOTE No further assessment is required if an existing assessment is valid for the load effects associated with a new parapet.

Assessment criteria

- 3.13 Unless otherwise agreed with the Overseeing Organisation, the structural assessment of existing structures shall be carried out in accordance with CS 454 [Ref 2.N].
- 3.14 For schemes involving partial assessment, assessment certification shall identify the elements covered and record the extent to which the previous design or assessment remains valid.

4. The process for dealing with existing structures

- 4.1 The process for dealing with existing structures, including any special requirements, specific actions or amendments to the design/assessment process at any stage, shall be agreed with the Overseeing Organisation prior to the commencement of the associated work.
- *NOTE* The process for dealing with existing structures can be dependent on the contract form and scheme specifics.
- 4.1.1 The process for dealing with existing structures should involve (subject to the agreement of the Overseeing Organisation):
 - 1) agreement of the scope of the widening scheme and identification of the preferred highway cross-section;
 - 2) a full search for data relating to all of the structures on the widening scheme;
 - 3) a review of this data to identify any missing data or discrepancies, including the updating of the asset database or equivalent if inaccuracies or supplementary information is found;
 - consultation with the Overseeing Organisation to obtain missing data and address any discrepancies; as well as to agree any structural renewals, inspection or assessment work to be carried out as part of the scheme;
 - 5) conducting any further inspection or assessment work agreed with the Overseeing Organisation where necessary to de-risk the scheme at an early stage;
 - the preparation of SORs for all modified, strengthened, upgraded or otherwise affected structures, and a schedule of any unaffected structures within the scheme, including the assumptions made in their classification as such;
 - 7) the detailed design of the geometric widening proposals for the scheme;
 - 8) the detailed design of the strengthened, upgraded, or modified structures, following approval of the preliminary design proposals by the Overseeing Organisation.
- 4.1.2 The flow chart below illustrates the typical process that should be followed for existing structures.



Figure 4.1.2 Process for existing structures

- NOTE Reductions in required highway cross-sections across an existing structure, with the agreement of the Overseeing Organisation, can provide a means of accommodating the widened highway without demolition/reconstruction or modification of the existing structure.
- 4.1.3 The technical process for the assessment/design of a modified structure may be simplified with the agreement of the Overseeing Organisation, depending on the type of structure and the modification proposed.

5. 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. CS 461, 'Assessment and upgrading of in-service parapets'
Ref 2.N	Highways England. CS 454, 'Assessment of highway bridges and structures'
Ref 3.N	Highways England. CG 304, 'Conservation of highway structures'
Ref 4.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 5.N	Highways England. CD 377, 'Requirements for road restraint systems'
Ref 6.N	The National Archives. legislation.gov.uk. Road Traffic Act 1988, 'Road Traffic Act 1988'
Ref 7.N	Highways England. CS 451, 'Structural review and assessment of highway structures'
Ref 8.N	Highways England. CS 453, 'The assessment of highway bridge supports'
Ref 9.N	Highways England. CD 350, 'The design of highway structures'
Ref 10.N	The National Archives. legislation.gov.uk. N.I. Orders No. 2994 (N.I. 18), 'The Road Traffic (Northern Ireland) Order 1995'
Ref 11.N	The National Archives. legislation.gov.uk. SI 1998/2003, 'The Road Vehicles (Authorisation of Special Types) (General) Order 2003'
Ref 12.N	The National Archives. legislation.gov.uk. SI 1998/3111, 'The Road Vehicles (Authorised Weight) Regulations 1998'

6. Informative references

The following documents are informative references for this document and provide supporting information.

Ref 1.I	Highways England. CD 127, 'Cross-sections and headrooms'
Ref 2.I	Highways England. CD 351, 'The design and appearance of highway structures'

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Design Manual for Roads and Bridges



Highway Structures & Bridges Design

CD 367 England National Application Annex to CD 367 Treatment of existing structures on highways widening schemes

(formerly BD 95/07)

Revision 0

Summary

There are no specific requirements for Highways England supplementary or alternative to those given in CD 367.

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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Version	Date	Details of amendments
0	Mar 2020	Highways England National Application Annex to CD 367.

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Design Manual for Roads and Bridges



Highway Structures & Bridges Design

CD 367 Northern Ireland National Application Annex to CD 367 Treatment of existing structures on highways widening schemes

(formerly BD 95/07)

Revision 0

Summary

There are no specific requirements for Department for Infrastructure, Northern Ireland supplementary or alternative to those given in CD 367.

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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Design Manual for Roads and Bridges



Highway Structures & Bridges Design

CD 367 Scotland National Application Annex to CD 367 Treatment of existing structures on highway widening schemes

(formerly BD 95/07)

Revision 0

Summary

This National Application Annex contains the Transport Scotland specific requirements for treatment of existing structures on highway widening schemes.

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: TSStandardsBranch@transport.gov.scot

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Release notes

Version	Date	Details of amendments
0	Mar 2020	Transport Scotland National Application Annex to CD 367.

Foreword

Publishing information

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

This document, along with CD 367, supersedes BD 95/07, 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 specific requirements for treatment of existing structures on highway widening schemes. In order to use public funds more effectively, future highways schemes need to make better use of existing roads and associated infrastructure. The widening of highways is an efficient means of achieving this.

Widening gives rise to many issues affecting existing structures. The treatment of these issues can have a major influence on the design and cost of the widening scheme. Valuable experience has been gained from a number of previous schemes, but this has not been recorded centrally and is not readily available to others in the form of advice.

A consistent approach is promoted to improve efficiency and avoid unnecessary design and construction work, with the overall aim of achieving better value for money on widening schemes.

Assumptions made in the preparation of this document

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

Terms and definitions

Term and definitions

Term	Definition
Modified structure	A structure for which the geometry of structural elements is being changed by a significant amount or a structure which is subject to a significant increase in load effect in order to accommodate a widened or re-aligned carriageway.
Overseeing Organisation	The roads authority responsible for motorways and all-purpose trunk roads in Scotland (for this document).

S/1. Assessments

- S/1.1 CD 367, cl. 3.6 shall not apply.
- S/1.2 Existing elements of modified structures shall be assessed to DMRB design requirements unless otherwise agreed with the Overseeing Organisation.

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.

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

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Design Manual for Roads and Bridges



Llywodraeth Cymru Welsh Government

Highway Structures & Bridges Design

CD 367 Wales National Application Annex to CD 367 Treatment of existing structures on highways widening schemes

(formerly BD 95/07)

Revision 0

Summary

There are no specific requirements for Welsh Government supplementary or alternative to those given in CD 367.

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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