Design Manual for Roads and Bridges

Highway Structures & Bridges
General information

CG 305
Identification marking of highway structures

(formerly BD 45/93)

Revision 0

Summary
This document contains the requirements for identification marking of highway structures on motorways and all-purpose trunk roads, including overbridges and underbridges.

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

This is a controlled document.

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Release notes

Version	Date	Details of amendments
0	Mar 2020	CG 305 replaces BD 45/93. The 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This document supersedes BD 45/93, which is withdrawn.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 updates and replaces BD 45/93 containing siting requirements and advice for the identification marking of highway structures on motorways and all-purpose trunk roads.

Assumptions made in the preparation of the document

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

Terms and definitions

Terms

Term	Definition
Acrylated rubber paint finish	As defined in CM 431 [Ref 1.l]
Chlorinated rubber paint finish	As defined in CM 431 [Ref 1.l]

1. Scope

Aspects covered

1.1 This document shall be used for identification marking of highway structures on motorways and all-purpose trunk roads, as defined in accordance with CG 300 [Ref 2.N].

Implementation

1.2 This document shall be implemented forthwith on all schemes involving identification marking on the Overseeing Organisations' motorway and all-purpose trunk roads according to the implementation requirements of GG 101 [Ref 1.N].

1.2.1 This document contains exclusions and amendments for some Overseeing Organisations and users should refer to the National Application Annexes for coverage.

1.3 For existing structures, in the interest of economy, identification marking requirements given in this document shall be carried out during access opportunities for other planned maintenance, general or principal inspections, whichever occurs sooner.

1.4 For new structures, identification marking shall be undertaken at the first principal inspection.

Use of GG 101

1.5 The requirements contained in GG 101 [Ref 1.N] shall be followed in respect of activities covered by this document.

2. Details of identification markers

Referencing system

2.1 Structures shall be allocated a reference in accordance with the Overseeing Organisation's requirements as outlined in the National Application Annexes.

2.2 Where structures have already been allocated a reference number in accordance with the requirements of the Overseeing Organisation, the existing reference shall continue to be used.

2.3 The identification reference shall be recorded in the Overseeing Organisation's database.

Character type and layout

2.4 The identification marker characters shall be stencilled either vertically or horizontally directly on to a white background.

2.5 Identification marker characters shall have an x-height of 75mm for dual carriageways and an x-height of 37.5mm for urban and single carriageway roads.

2.6 Identification marker characters shall conform to guidance stipulated in Chapter 7 of the Traffic Signs Manual (TSM Chapter 7 [Ref 3.N]), regarding spacing.

NOTE *Examples are provided in National Application Annexes.*

2.7 Identification marker characters shall be upper case.

2.7.1 Identification marker characters should be bold and adopt the Arial or Transport Heavy Alphabet typeface.

2.8 Retroreflective number plates shall not be fixed to structures.

3. Siting of identification markers

Permission

3.1 Where a structure is not owned by the Overseeing Organisation, written agreement to the placement and siting of identification markings shall be obtained from asset owners beforehand, and filed in accordance with the Overseeing Organisation's records procedures.

Structures adjacent to the carriageway

3.2 Where structures are adjacent to the carriageway, identification markers shall be placed in a prominent and visible location on structures so that they are in a convenient position for maintenance and inspection purposes.

NOTE *Locations of identification markers on structures are illustrated in Appendix A.*

3.2.1 On single carriageways, one identification marker should be placed adjacent to the lane carrying traffic in the direction of increasing road kilometerage.

3.2.2 On dual carriageways, two identification markers should be placed on the structure; one adjacent to each side of the carriageway.

3.2.3 At intersections of motorways and / or trunk roads, identification markers should be placed on the structure in positions relative to both roads.

3.2.4 On long viaducts, such as the Midland Links viaduct, identification markings should be placed on both the superstructure and individual substructures.

3.2.5 Where vandalism is likely to be a problem, identification markers should be placed at 3m minimum height above the carriageway level.

3.2.6 For overbridges, identification markers should be placed on piers or abutments facing the carriageway 1m above either the top of the safety fence or the carriageway level, whichever is higher, as illustrated in Appendix A1.1.

3.2.7 For overbridges going over a secondary road, identification markers should be marked on the structure adjacent to the secondary road, on parapet plinths or on top of copings, as illustrated in Appendix A1.1.

3.2.8 For underbridges with concrete or brick parapets, identification markers should be placed on the parapet facing the carriageway, at the approach end, as illustrated in Appendix A1.2.

3.2.9 For underbridges going under a secondary road, identification markers should be marked on the structure adjacent to the secondary road, on wing wall tops.

3.2.10 On underbridges with metal parapets, identification markers should be placed on the concrete plinths between first and second posts, at the approach end, as illustrated in Appendix A1.2

3.2.11 For culverts, identification markers should be placed at the end of the retaining wall adjacent to the culvert where this can be safely achieved, as illustrated in Appendix A1.3.

3.2.12 For signal gantries, identification markers should be placed facing the carriageway on the support, as illustrated in Appendix A1.4.

3.2.13 On retaining walls, including gabion walls, identification markers should be placed adjacent to the carriageway, at the approach end, facing the road, as illustrated in Appendix A1.5.

3.2.14 For gabion walls, identification markers should be applied to a suitably sized board and attached to the gabion cages e.g. by galvanised twisted wire.

3.2.15 For gabion walls, the identification marker and board should be suitably durable, as required in section 4.

3.2.16 For lighting columns, identification markers should be placed 1m above carriageway level on the mast or on the end columns, as illustrated in Appendix A1.6.

Structures remote from the carriageway

3.3 Where structures are remote from the carriageway, identification markers shall be positioned for maintenance and inspection purposes.

NOTE *This can allow smaller characters to be used if the marker is intended to be read at close quarters.*

3.3.1 Where retaining walls are positioned at the bottom of embankments, identification markers should be marked either on top of the wall or at the end of the wall, as illustrated in Appendix A1.3.

3.3.2 For culverts, identification markers should be placed on top of the wall, as illustrated in Appendix A1.3.

Health and safety

3.4 The proposed location of the identification marker must be subject to a site specific risk assessment, including aspects involving the initial provision and subsequent maintenance operations.

NOTE *In writing the advice clauses on suitable locations for identification markers in section 3, it is not possible to predict or know all the possible situations and risks involved in achieving the placement requirements. The development of a risk assessment has been set as a minimum safety provision to ensure each proposed location for an identification marker is subject to a site specific risk assessment prior to any painting or maintenance of identification markers being undertaken.*

4. Painting and maintenance of identification markers

Materials

4.1 The identification marker shall be designed and specified with suitable materials to be legible at the end of a 10 year period.

4.1.1 Suitable paint should be selected to provide a 10 year minimum life in the environment to which it is subjected.

4.2 The paint shall be specified to be compatible with the structure surface, and in the case of a steel structure, be compatible with the existing paint system.

Surface preparation of concrete or masonry

4.3 Surfaces shall be dry cleaned by brushing to remove any loose or deleterious matter, including dirt, moss and algae, to achieve a sound substrate prior to painting.

Surface preparation of painted steel

4.4 A suitable area for painting shall be selected.

4.5 Any minor defects, grease or salts shall be removed by wet or dry scrubbing.

4.5.1 Defects or contamination should be removed from the surface using a stiff bristle brush.

4.6 Cold, clean water shall be used to remove any cleaning agents by rinsing thoroughly.

4.7 Sound finishing paint shall be freed of all visible gloss to provide a satisfactory key, except chlorinated rubber and acrylated rubber finishes.

4.7.1 Hand abrading methods should be used, to avoid damaging the lower layers of the paint system.

4.8 A non-impact method shall be used to remove unsound paint.

Application of paint

4.9 Paints shall be applied in single coats to dry surfaces in accordance with the manufacturer's recommendation.

4.9.1 The paint should be applied by brush or roller.

4.10 Paints shall not be applied during rain, fog, mist, in a dust-laden atmosphere, when the ambient temperature is less than 5°C or when the relative humidity exceeds 90%.

Maintenance of identification markers

4.11 Identification markers shall be checked, and cleaned where necessary, during routine inspection and maintenance operations.

4.12 Re-stencilling shall be carried out:

1) when deterioration prevents reading of the identification marker and
2) at least once every 10 years

4.13 When maintenance of an identification marker is undertaken the date shall be recorded in the Overseeing Organisation's database.

Health and safety

4.14 Any painting and maintenance of identification markers must be subject to a risk assessment to cover all aspects of the task.

4.14.1 It may be appropriate to adapt the safe system of work used during concurrent inspection or maintenance tasks.

4.15 As a minimum the risks assessed shall include, but not be limited to:

1) the use of substances hazardous to health, and
2) any aspects of the task which put the worker at additional risk due to the proposed location and extended duration of the task.

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. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 2.N	Highways England. CG 300, 'Technical approval of highway structures'
Ref 3.N	The Stationery Office. TSM Chapter 7, 'Traffic Signs Manual Chapter 7 - The Design of Traffic Signs'

6. Informative references

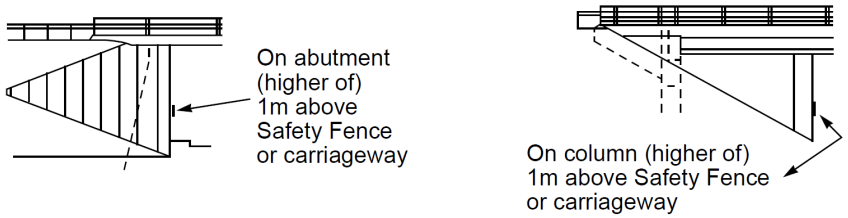
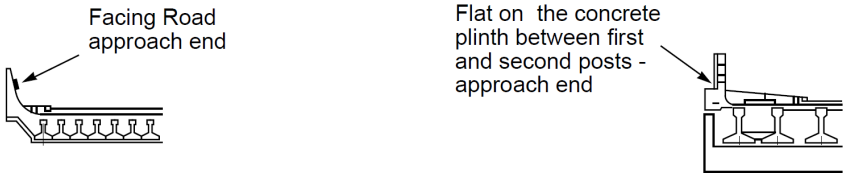
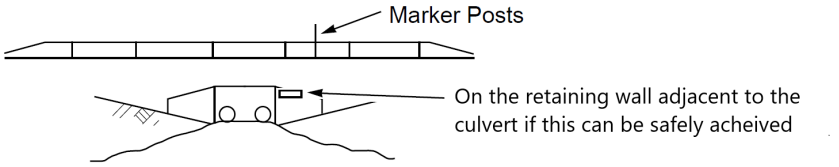
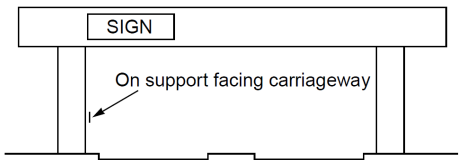
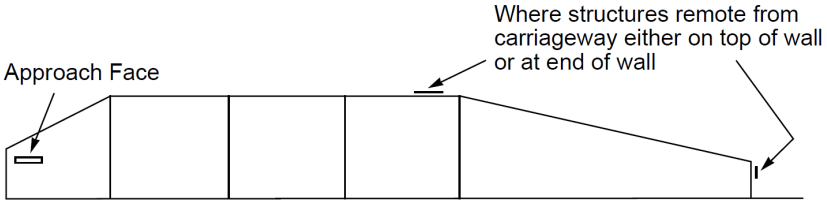
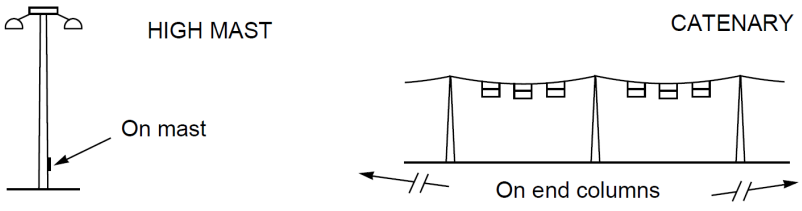
The following documents are informative references for this document and provide supporting information.

Ref 1.I	Highways England. CM 431, 'Maintenance painting of steelwork'

Appendix A. Diagrams for the siting of identification markers

A1 Siting of identification markers on structures

Table A.1 Diagrams showing the siting of identification markers on different structures.

Ref	Structure type	Siting of identification markers
A1.1	Overbridges	
A1.2	Underbridges	
A1.3	Culverts	
A1.4	Sign / signal gantries	
A1.5	Retaining walls	
A1.6	Lighting columns	

Highway Structures & Bridges
General information

CG 305
England National Application Annex to CG 305 Identification marking of highway structures

(formerly BD 45/93)

Revision 0

Summary
This National Application Annex sets out the Highways England-specific requirements on identification marking of highway structures.

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 CG 305.

Foreword

Publishing information

This document is published by Highways England.

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-specific requirements related to identification marking of highway structures.

Assumptions made in the preparation of the document

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

E/1. References for identification markers on structures in England

E/1.1 The reference shall be developed for the structure to be marked.

E/1.1.1 The early notification process should be followed to establish the structure number and then the reference, using the following definition of structure number elements in these NOTEs.

NOTE 1 The structure number, as given in the structures management information system (SMIS), is made up of the following elements [a] 00 / [b] X 000 (X) / [c] ? / [d] 00. 000 [e] X [f] ?:

1) *[a] Junction number: motorway junction number if appropriate [e.g. 19];*
2) *[b] Road: road title in the form as known by the normal road user [for examples M55, A1(M), A38 but not A43(T)].*
3) *[c] Slip road (designator): for structures at interchanges of roads which are not situated on either interchange road;*
4) *[d] Kilometerage: preceding kilometerage (0.1 km) marker post for motorways with marker posts or the equivalent for other motorways and trunk roads [e.g. 165.3];*
5) *[e] Type tag: e.g. 'Q' for culverts, 'R' for retaining walls, 'S' for sign/signal gantry or 'A', 'B' etc. for widened bridges;*
6) *[f] Individual structure type: to distinguish between structures within the same marker posts or within 0.1 kilometres of each other or for widened structures other than bridges which have been split into smaller sections [e.g. 1,2,3 etc.].*

NOTE 2 Elements d, e and f are to be used when establishing the reference to be allocated to structures.

E/1.2 The bridge reference shall include the road over as a prefix to assist in identification from the road under e.g. A35/165 3.

NOTE In this example, A35 is not element [b] but instead the road going over or under the structure.

E/1.2.1 Where two or more structures share a common kilometerage value, the structure suffixes should be included with the reference e.g. 165 3/S5 where S = sign/signal gantry, 5 = the sixth structure referenced 165 3 (the first being 0).

NOTE In this example, elements [d], [e] and [f] are used and taken from SMIS.

E/1.2.2 At intersections of motorways and/or trunk roads the structure reference should be derived from the kilometerage of the road carrying traffic over.

E/1.2.3 Where several structures are grouped within an interchange they should:

1) have the road identifier and structure suffix included; and,
2) share the intersection kilometerage

NOTE e.g. A35/165 3/S5

E/2. Character type and layout

Character type

E/2.1 Characters shall conform to guidance stipulated in section 2 and chapter 7 of The Traffic Signs Manual TSM Chapter 7 [Ref 2.N] regarding spacing.

Layout

E/2.2 The layout of characters shall allow the marker to be read at the appropriate distance and to fit on the asset.

Figure E/2.2a Layout of numbers for motorways and dual all-purpose trunk roads

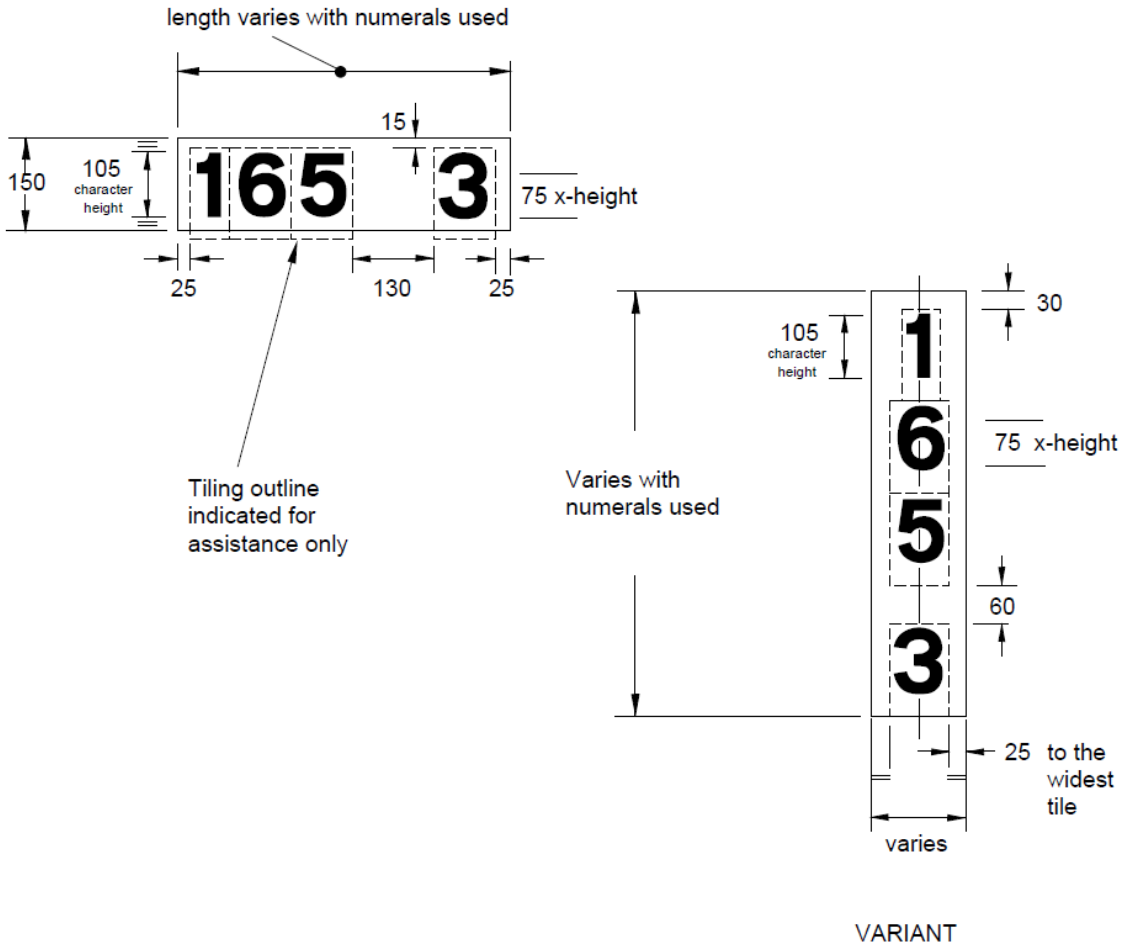
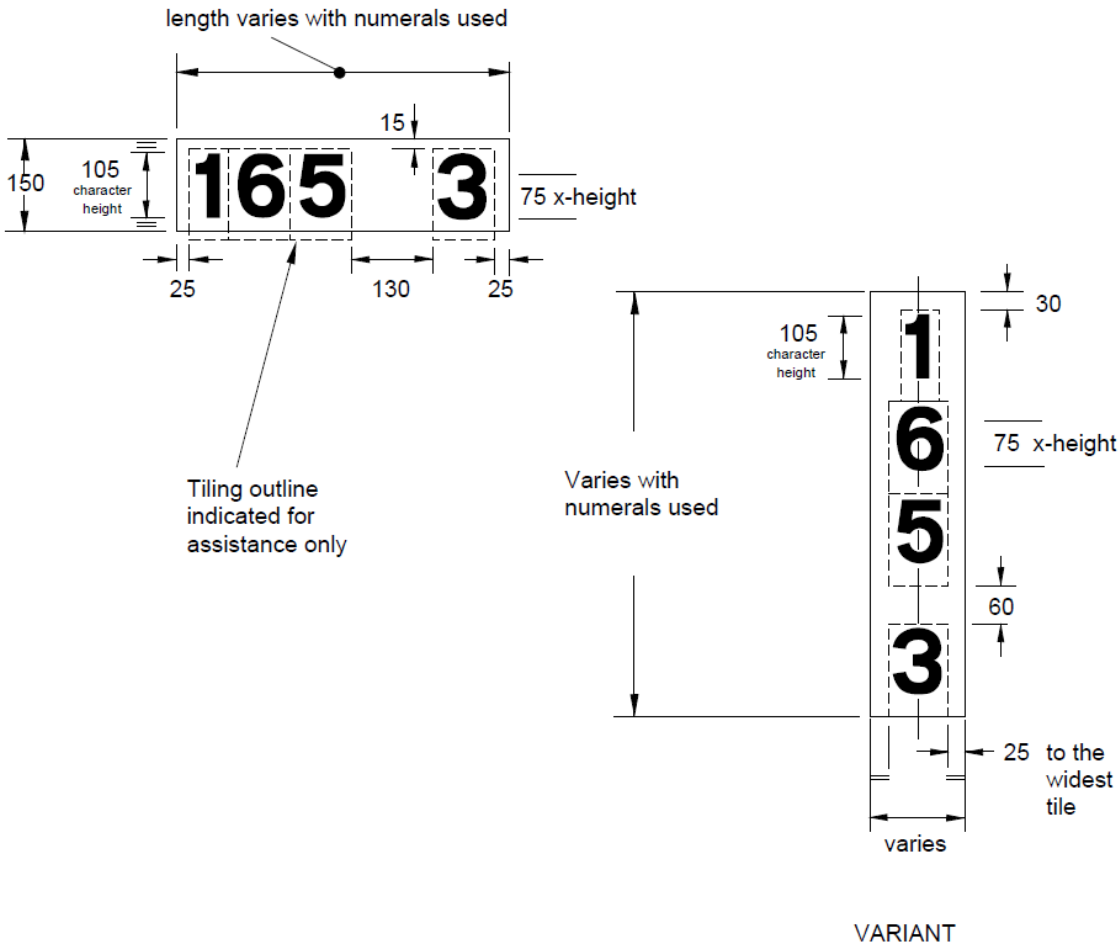


Figure E/2.2b Layout of numbers for urban and single carriageway roads



E/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	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 2.N	The Stationery Office. TSM Chapter 7, 'Traffic Signs Manual Chapter 7 - The Design of Traffic Signs'

Department for Infrastructure
An Roinn Bonneagair

Highway Structures & Bridges
General information

CG 305
Northern Ireland National Application Annex to CG 305 Identification marking of highway structures

(formerly BD 45/93)

Revision 0

Summary
There are no specific requirements for the Department for Infrastructure, Northern Ireland supplementary or alternative to those given in CG 305.

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

This is a controlled document.

Contents

Release notes **2**

Release notes

Version	Date	Details of amendments
0	Mar 2020	Department for Infrastructure Northern Ireland National Application Annex to CG 305.

Highway Structures & Bridges
General information

CG 305
Scotland National Application Annex to CG 305 Identification marking of highway structures

(formerly BD 45/93)

Revision 0

Summary
There are no specific requirements for Transport Scotland supplementary or alternative to those given in CG 305.

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

This is a controlled document.

Contents

Release notes **2**

Release notes

Version	Date	Details of amendments
0	Mar 2020	Transport Scotland National Application Annex to CG 305.

Llywodraeth Cymru
Welsh Government

Highway Structures & Bridges
General information

CG 305
Wales National Application Annex to CG 305 Identification marking of highway structures

(formerly BD 45/93)

Revision 0

Summary
This National Application Annex contains the Welsh Government-specific requirements for the identification marking of highway structures.

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

This is a controlled document.

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Release notes

Version	Date	Details of amendments
0	Mar 2020	Welsh Government National Application Annex to CG 305.

Foreword

Publishing information

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

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-specific requirements related to identification marking of highway structures.

Assumptions made in the preparation of this document

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

W/1. References for identification markers on structures in Wales

Referencing System (CG 305 [Ref 1.N])

W/1.1 The reference codes for each structure shall be developed in accordance with Appendix A.

W/1.2 Reference codes shall not be duplicated.

NOTE *The reference code is between 6 and 12 characters long.*

W/2. Character type and layout

Character typeface

W/2.1 Characters shall conform to guidance stipulated in Section 2 and Chapter 7 of the Traffic Signs Manual TSM Chapter 7 [Ref 3.N] regarding spacing.

Layout

W/2.2 The layout of characters shall allow the marker to be read at the appropriate distance and to fit on the asset.

Figure W/2.2a Layout of numbers for motorway and dual all-purpose trunk roads

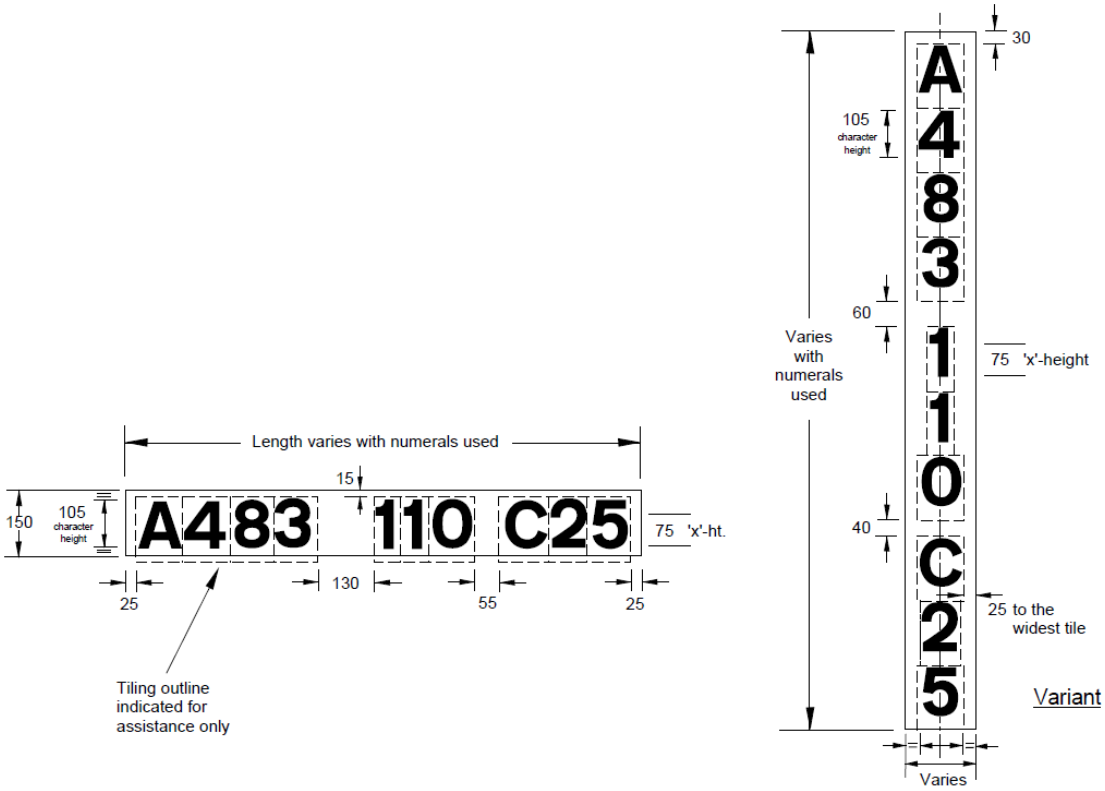
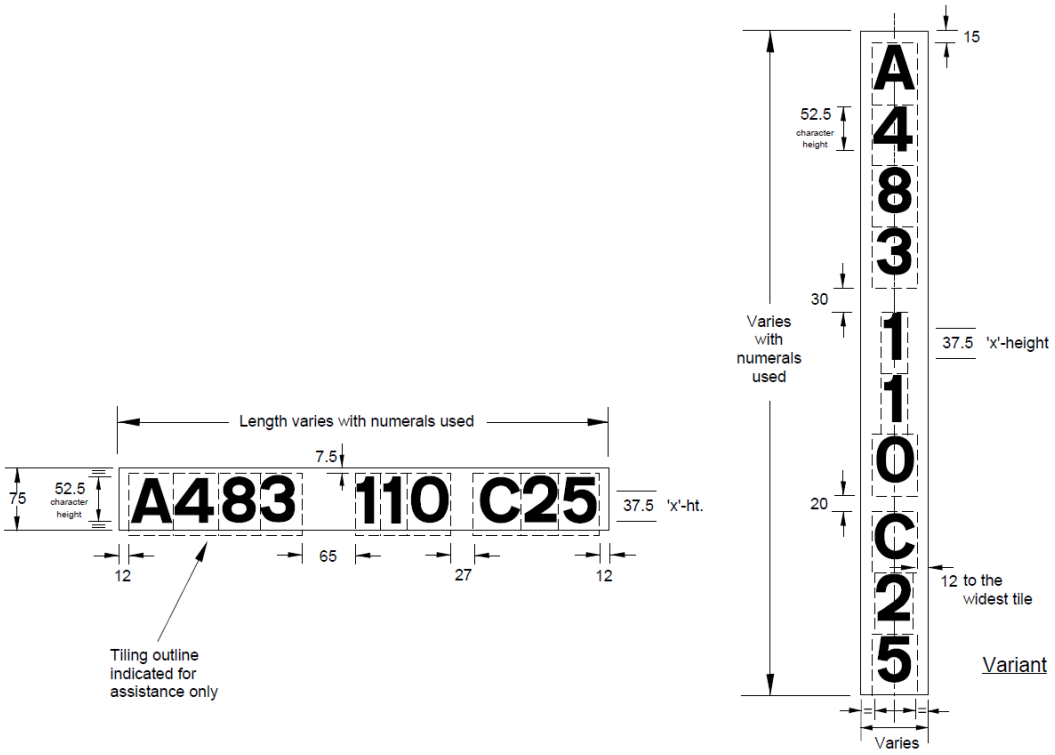


Figure W/2.2b Layout of numbers for urban and single carriageway roads



W/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	Highways England. CG 305, 'Identification marking of highway structures'
Ref 2.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 3.N	The Stationery Office. TSM Chapter 7, 'Traffic Signs Manual Chapter 7 - The Design of Traffic Signs'

Appendix W/A. References for identification markers on structures in Wales

W/A1 Introduction

All Welsh Government maintainable structures are uniquely numbered using a system designed to give an indication of the location and type of structure.

Structures are referenced to the road number for which they provide their function, this will include structures supporting or crossing the road.

Where two "A" trunk road or motorways cross, the number will be referenced to the structure carrying the road. All numbers are based on the centre point of the structure.

Bridges and footbridges are used as the benchmarks from which all other structures are referenced.

W/A2 'A' trunk road structures

W/A2.1 Bridges on "A" trunk roads

Bridges are numbered sequentially along the roads and use a two part number consisting of the road number and the sequential number (originally incremented by 10).

Table W/A.1 Bridge

Road number	Space	Sequential number
A40		10

Displayed as: A40 10

When adding new structures these will inevitably be located between existing structures and will require numbers other than 10's to be used. The new numbering should be in accordance with the downlink to uplink direction. Any number between 1 and 9 can be used but consideration should be given to the proximity of the adjacent structures. As an example, A 40 15 would be appropriate for a new structure half way between the A40 10 and the uplink bridge or footbridge, A40 12 if closer to A40 10 and A40 17 if closer to the uplink.

W/A2.2 Fotbridges on "A" trunk roads

Footbridges, like bridges, are numbered sequentially along the roads using the same numbering with the addition of a suffix "F".

Table W/A.2 Footbridge example

Road number	Space	Sequential number	Suffix
A40		20	F

Displayed as: A40 20F

W/A2.2.1 Other structures on "A" trunk roads

Other structure types with suffixes as shown in table W/A.3 are identified by the percentage of the distance travelled up-chainage between sequential bridges (or footbridges).

Table W/A.3 Other structure type letters

Suffix	Structure type
A	Associated structure
C	Culvert
G	Sign gantry
H	High mast lighting column
T	CCTV support
V	Variable message sign support
W	Retaining wall

In the case below A40 20 is the downlink bridge and the culvert is 45% of the distance between A40 20 and the next uplink bridge or footbridge.

Table W/A.4 Minor structures alternative reference

Bridge number	Space	Type letter	% distance
A40 20		C	45

Displayed as: A40 20 C45

W/A2.3 Structures on "A" trunk road slip roads

Where a structure provides its function to a slip road rather than the main carriageway it is numbered in the same format but an "S" suffix is added to the road number.

Table W/A.5 Structures on slip roads

Road number	Slip road suffix	Space	Sequential number
A40	S		30

Displayed as: A40S 30

W/A3 Motorway structures

W/A3.1 Motorway structures on links

W/A3.1.1 Bridges on motorway links

Numbering on the motorway is referenced from the junctions rather than bridges and footbridges.

The downlink and uplink junctions form part of the number and all structure types use the percentage distance at which they are located between them (downlink to uplink).

Table W/A.6 Motorway structures (on links)

Motorway ref	Space	Junctions	Space	% distance
M4		25-26		30

Displayed as: M4 25-26 30

W/A3.1.2 Footbridges on motorway links

Footbridges use the same F suffix as for "A" trunk road structures.

Table W/A.7 Motorway footbridges (on links)

Motorway ref	Space	Junctions	Space	% distance	Suffix
M4		23A-24		56	F

Displayed as: M4 23A-24 56F

W/A3.1.3 Other structure types on motorway links

Other structure types on motorway links use the same type letters as the other structures on "A" trunk road structures, as shown in table W/A.3.

Table W/A.8 Other structures on motorways

Motorway ref	Space	Junctions	Space	Type letter	% distance
M4		47-48		C	13

Displayed as: M4 47-48 C13

W/A3.2 Motorway structures within a junction

W/A3.2.1 Bridges within motorway junctions

For the purposes of structure numbering the motorway junction is defined as the area between the points the slip road joins or leaves the main carriageway on the downlink side to the points the slip road joins or leaves the main carriageway on the uplink side. All structures falling within this area use the junction as both downlink and uplink in the number and the % distance is replaced by an incremental number which bears no relation to the position.

Table W/A.9 Bridges within a junction

Motorway ref	Space	Junction	Space	Increment
M4		30-30		10

Displayed as: M4 30-30 10

W/A3.2.2 Other structures within motorway junctions

For other structures a type letter is added before the increment number

Table W/A.10 Other structures within a junction

Motorway ref	Space	Junction	Space	Type letter	Increment
M4		23A-23A		V	20

Displayed as: M4 23A-23A V20

W/A3.2.3 Structures on motorway slip roads

Where any structure exists on a slip road rather than the main carriageway it is numbered in the same format but an "S" suffix is added to the road number.

Table W/A.11 Structures on slip roads

Motorway ref	Slip road suffix	Junction	Space	Increment
M4	S	47-47		40

Displayed as: M4S 47-47 40