Design Manual for Roads and Bridges

Road Layout
Design

CD 143
Designing for walking, cycling and horse-riding

(formerly TA 90/05, TA 91/05, TA 68/96, TD 36/93)

Version 2.0.1

Summary
This document provides requirements and advice for the design of walking, cycling and horse-riding facilities on and/or adjacent to the motorway and all-purpose trunk road network.

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.

Contents

Latest release notes

Document code	Version number	Date of publication of relevant change	Changes made to	Type of change
CD 143	2.0.**1**	March 2021	Core document, Scotland NAA	Incremental change to notes and editorial updates

New version of document published solely to resolve revision number issue.

This was caused when an amendment was made to the Scotland National Application Annex document in May 2020 to remove duplicate wording without a new revision number being issued. This meant there were incorrectly two revision 2 documents available on the website with different publication dates of March 2020 and May 2020.

No changes have been made to the core document and England National Application Annex since they were last updated in March 2020. No changes have been made to the Wales and Northern Ireland National Application Annexes since their original publication in November 2019. The Scotland National Application Annex is being re-published with a new revision number 1.0.1 to reflect the change made in May 2020 and no further changes have been made since this time.

Previous versions

Document code	Version number	Date of publication of relevant change	Changes made to	Type of change
CD 143	2	May 2020		
CD 143	2	March 2020		
CD 143	1	January 2020		
CD 143	0	November 2019		

Foreword

Publishing information

This document is published by Highways England.

This document supersedes TA 90/05, TA 91/05, TA 68/96 and TD 36/93, which are withdrawn.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 provides requirements and advice for the design of walking, cycling and horse-riding facilities on and/or adjacent to the motorway and all-purpose trunk road network.

Assumptions made in the preparation of this document

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

Abbreviations

Abbreviations

Abbreviation	Definition
km	Kilometre
kph	Kilometres per hour
mm	Millimetre
mph	Miles per hour
NAA	National Application Annex
SSD	Stopping sight distance

Terms and definitions

Terms and definitions

Term	Definition
Absolute minimum	The design parameter(s) that can be used where there is an existing physical constraint where a walking, cycling or horse-riding route is proposed, or an existing walking, cycling or horse-riding route is to be improved within the highway boundary.
Desirable minimum	Design parameters that apply where the conditions for use of absolute minimum value criteria are not applicable.
Headroom	The distance above the surface of a walking, cycling or horse-riding route that is generally free from obstructions to allow the safe passage of users. NOTE: Headroom for subways is separate from the general headroom space.
Separation	The distance between a walking, cycling or horse-riding route and the carriageway.
Shared use	A facility used by more than one type of user - for example pedestrians and cyclists or pedestrians, cyclists and equestrians. This includes segregated or unsegregated facilities.
Stopping sight distance	The distance for a cyclist or equestrian to perceive, react and stop safely in adverse conditions, such as on wet asphalt or where the surfacing is loose.

1. Scope

Aspects covered

1.1 This document shall be used for the design of walking, cycling and horse-riding routes on and/or adjacent to the motorway and all-purpose trunk road network.

NOTE 1 CD 195 [Ref 2.N] provides requirements and advice for the design of cycle traffic infrastructure.

NOTE 2 Information on Inclusive Mobility is available in Inclusive Mobility [Ref 3.N].

NOTE 3 Information on tactile surfaces is available in Guidance on the use of Tactile Paving Surfaces PPU 1622RB [Ref 1.I].

1.2 The National Application Annexes (NAAs) shall be used for designing for walking, cycling and shared use.

Implementation

1.3 This document shall be implemented forthwith on all schemes involving walking, cycling or horse-riding facilities 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

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

2. General design principles

2.1 Walking, cycling and horse-riding routes shall be free from unnecessary diversions, frequent obstacles and fragmented facilities.

2.1.1 Where absolute and desirable minimum values are provided within this document, the desirable minimum value should be used unless an existing physical constraint prevents the use of this.

2.1.2 Walking, cycling and horse-riding routes should be designed to achieve the best balance of the five core design principles in Table 2.1.2.

Table 2.1.2 Core design principles for walking, cycling and horse-riding

Coherence	Link trip origins and destinations, including public transport access points. Routes are continuous and easy to navigate.
Directness	Serve all the main destinations and seek to offer an advantage in terms of distance and journey time.
Comfort	Infrastructure meets design standards and caters for all types of user, including children and disabled persons.
Attractiveness	Aesthetics, noise reduction and integration with surrounding areas are important.
Safety	Dedicated networks and facilities not only improve pedestrian, cyclist and equestrian safety, but also their feeling of how safe the environment is. This includes access to adjacent areas, sightlines, fencing, lighting, landscaping and surveillance. It also includes avoiding opportunities for assailants to conceal themselves.

3. Walking routes

3.1 NAAs shall be used for the design of routes and facilities for walking.

4. Cycling routes

4.1 NAAs shall be used for the design of routes and facilities for cycling.

5. Horse-riding routes

General

5.1 Horse-riding routes shall be designed to minimise the need for equestrians to lead horses.

NOTE *Horses can be better controlled when ridden rather than led.*

Design speed

5.2 Design speeds for horse-riding routes shall be in accordance with Table 5.2.

Table 5.2 Design speeds for horse-riding routes

Horse-riding activity	Design speed	Example situations
Trot/canter	20 kph	Remote from carriageway (for ≥ 50.0 metres length)
Walk	10 kph	Adjacent to carriageway; On approach to crossing; Remote from carriageway (for < 50.0 metres length)

NOTE *Remote from the carriageway means the road is either:*

1) generally not visible due to screening or planting; or

2) visible, but more than 6.0 metres from the horse-riding route.

Visibility

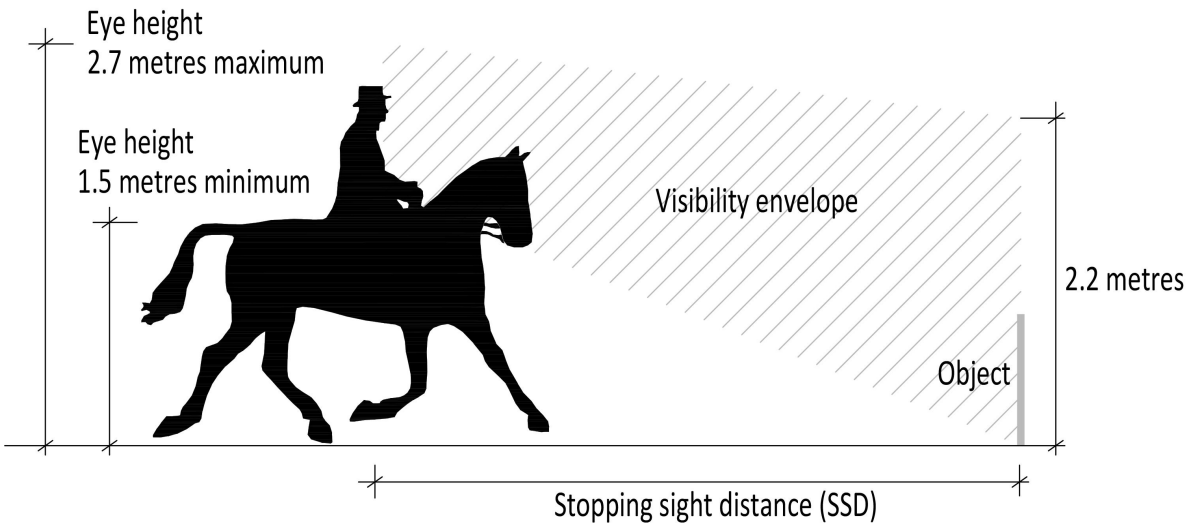
5.3 Stopping sight distance (SSD) for equestrians shall be in accordance with Table 5.3.

Table 5.3 SSD for equestrians

Design speed	SSD
20 kph	30.0 metres
10 kph	10.0 metres

5.4 For equestrians, the forward visibility envelope shall allow for objects between the ground and a height of 2.2 metres to be visible from a rider's eye height of 1.5 metres to 2.7 metres, in accordance with Figure 5.4.

Figure 5.4 Forward visibility envelope for equestrians



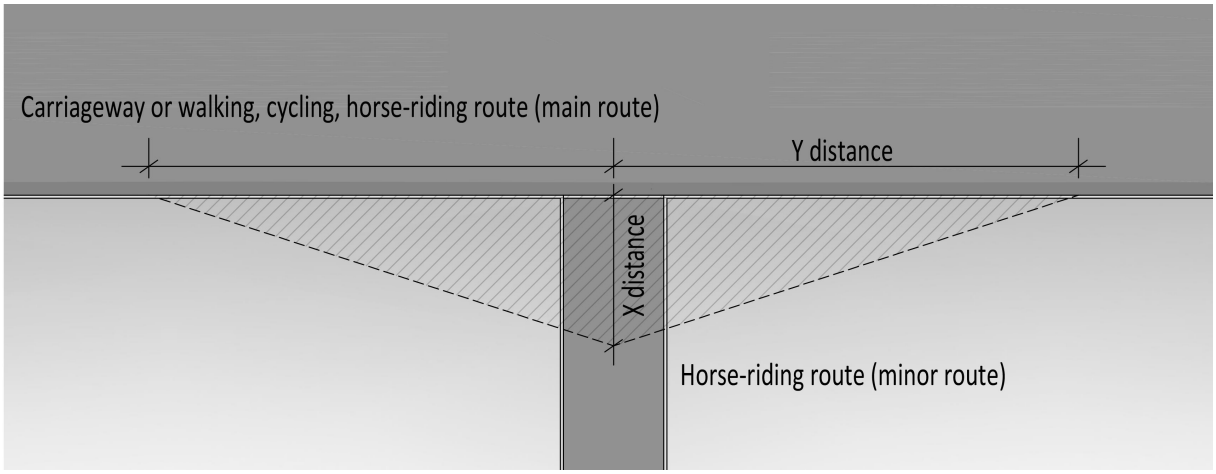
NOTE *The object height is taken as a range so that equestrians can observe deformations, holes and objects which could interfere with the horse's progress.*

Visibility at junctions and crossings

5.5 Visibility splays shall be provided for horse-riding routes at junctions and crossings where equestrians have to stop or give way.

NOTE *Figure 5.5N provides a diagram of visibility splay "x" and "y" distances for horse-riding routes.*

Figure 5.5N Visibility splay "x" and "y" distances for horse-riding routes



5.6 "Y" distances shall be measured from an eye height of 1.5 metres to 2.7 metres for equestrians.

5.7 When measuring "y" distances at junctions or crossings, the object height shall be taken as 0.26 metres to 2.0 metres.

5.8 Visibility splay "x" distances for equestrians at junctions and crossing points with mainline carriageways shall be provided in accordance with Table 5.8.

Table 5.8 Visibility "x" distance requirements for equestrians at junctions and crossings

Desirable minimum	Absolute minimum
5.0 metres	3.0 metres

5.9 Visibility splay "y" distance for equestrians at junctions and crossing points with mainline carriageways shall be provided in accordance with Table 5.9.

Table 5.9 Visibility splay "y" distance requirements for equestrians at junctions and crossings with mainline carriageways

85th percentile approach speed on mainline carriageway	"Y" distance
40 kph	135.0 metres
50 kph	168.0 metres
60 kph	211.0 metres
85 kph	270.0 metres
100 kph	345.0 metres

5.10 Visibility splay "y" distances for equestrians at junctions and crossing points with horse-riding routes shall be in accordance with the SSD values for equestrians as provided in Table 5.3.

5.11 For visibility splay "y" distances for equestrians at junctions and crossing points, CD 195 [Ref 2.N] shall be used.

Gradient

5.12 The maximum longitudinal gradient on a horse-riding route, where cycling is prohibited, shall be 20%.

NOTE *Where cycling is permitted on a horse-riding route the maximum gradient is defined by the cycling requirements.*

5.12.1 Longitudinal gradients on horse-riding routes should be kept to a minimum.

5.12.2 Steps may be used to reduce the overall longitudinal gradient on horse-riding routes.

5.13 Where steps are used on horse-riding routes, these shall be 0.15 metres in height and 2.8 metres in length.

5.14 Where steps are used on horse-riding routes, these shall consist of a maximum longitudinal gradient of 10% on each step.

Crossfall

5.15 On horse-riding routes, the crossfall values for footways in Inclusive Mobility [Ref 3.N] shall be used.

5.15.1 Adverse crossfall on bends should be avoided on horse-riding routes.

Cross-sections

5.16 Surfaced widths for horse-riding routes shall be in accordance with Table 5.16.

Table 5.16 Surfaced widths for horse-riding routes

Minimum 2-way width (where horses are expected to pass each other)	3.0 metres
Minimum single file width	2.0 metres

5.16.1 Horse-riding routes where single file use is unavoidable should be signed accordingly.

5.16.2 Sudden changes in widths on horse-riding routes should be avoided except at gates.

5.16.3 Where changes in widths are necessary on horse-riding routes, tapers of no sharper than 1:7 should be used.

5.16.4 Locations to turn a horse around on a horse-riding route should be available at intervals of no more than 1km.

5.16.5 The surfaced width of the horse-riding route at horse turning points should be a minimum of 3.0 metres.

5.16.6 On horse-riding routes or horse-riding routes shared with pedestrians and/or cyclists, the separation from the carriageway should be a minimum of 1.8 metres.

NOTE *Where a hard strip is provided on the carriageway, it can be considered as part of the separation distance for horse-riding routes.*

5.16.7 Where visual screening is provided between the horse-riding route and the carriageway, gaps should be avoided as the sight and sound of vehicles can unnerve horses.

Access controls

5.17 Where bridle gates are used on horse-riding routes, a minimum width of 1.525 metres between posts shall be provided.

5.17.1 There should be a surfaced width of 3.0 metres on either side of a bridle gate for a distance of 5.0 metres.

NOTE *A surfaced width of 3.0 metres either side of a bridle gate allows an equestrian to turn 90 degrees after passing through the gate to be able to close it from horseback.*

5.17.2 Fencing for 1.5 metres each side of a bridle gate should be free of barbed wire and overhanging trees.

Headroom on horse-riding routes

5.18 Except for momentary obstructions, headroom for horse-riding routes where horses are ridden shall be a minimum of 3.4 metres.

5.19 Where momentary obstructions are present on a horse-riding route, the minimum headroom shall be 2.8 metres at the momentary obstruction.

NOTE 1 *Momentary obstructions can include overhanging trees and signs.*

NOTE 2 *For headroom requirements at subways see equestrian crossings.*

5.19.1 If horses are led rather than ridden, 2.8 metres headroom on horse-riding routes may be used over longer distances than for momentary obstructions, such as below bridges.

5.19.2 Where horses are to be led on horse-riding routes, mounting blocks should be provided on either side of the area where horses are to be led together with signs advising equestrians to dismount.

Equestrian crossings

5.20 Where there is a parking demand, physical measures to prevent parking at equestrian crossings shall be included in the scheme design.

5.20.1 Protective posts may be provided to prevent parking at horse-riding routes that are crossed by vehicular accesses to the carriageway.

5.21 Where overbridges are proposed for equestrian use, CD 353 [Ref 1.N] shall be used on the approach to the bridge for cross-sections, fences and infill panels.

NOTE *Underpasses are preferred to overbridges by equestrians for grade-separated crossings.*

5.22 Stand-alone signal controlled crossings for equestrians shall not be provided where the 85th percentile speed exceeds 50mph.

NOTE *Information on calculating 85th percentile speeds is available in CA 185 [Ref 7.N].*

5.23 At-grade equestrian crossings shall not be provided on:

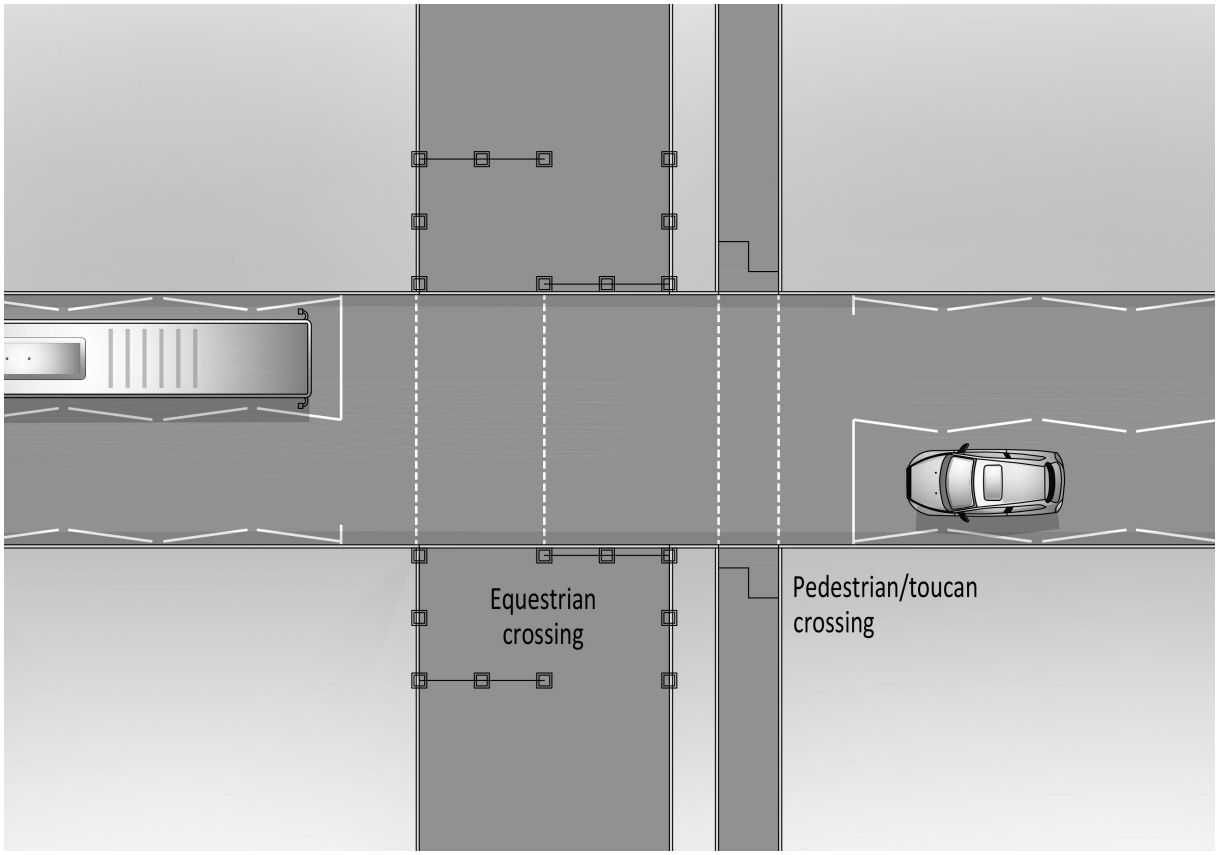
1) roads with a 120 kph design speed;
2) wide single carriageways;
3) wide single 2+1 roads; and
4) single carriageways with climbing lanes.

5.23.1 Signal controlled equestrian crossings should not be combined with a pedestrian and/or cyclist crossing in order to avoid potential conflict.

NOTE 1 *Signal controlled equestrian crossings can be installed parallel to pedestrian and/or cyclist crossings.*

NOTE 2 *A drawing of a typical signal controlled equestrian crossing parallel to a pedestrian and/or cyclist crossing is shown in Figure 5.23.1N2.*

Figure 5.23.1N2 Indicative signal controlled equestrian crossing parallel to a pedestrian and/or cyclist crossing



5.23.2 At equestrian crossing points, a 10.0 metres wide band of high friction surfacing should be provided across the carriageway to prevent horses from slipping.

5.23.3 Where high friction surfacing is used, this should be of the same colour as the carriageway.

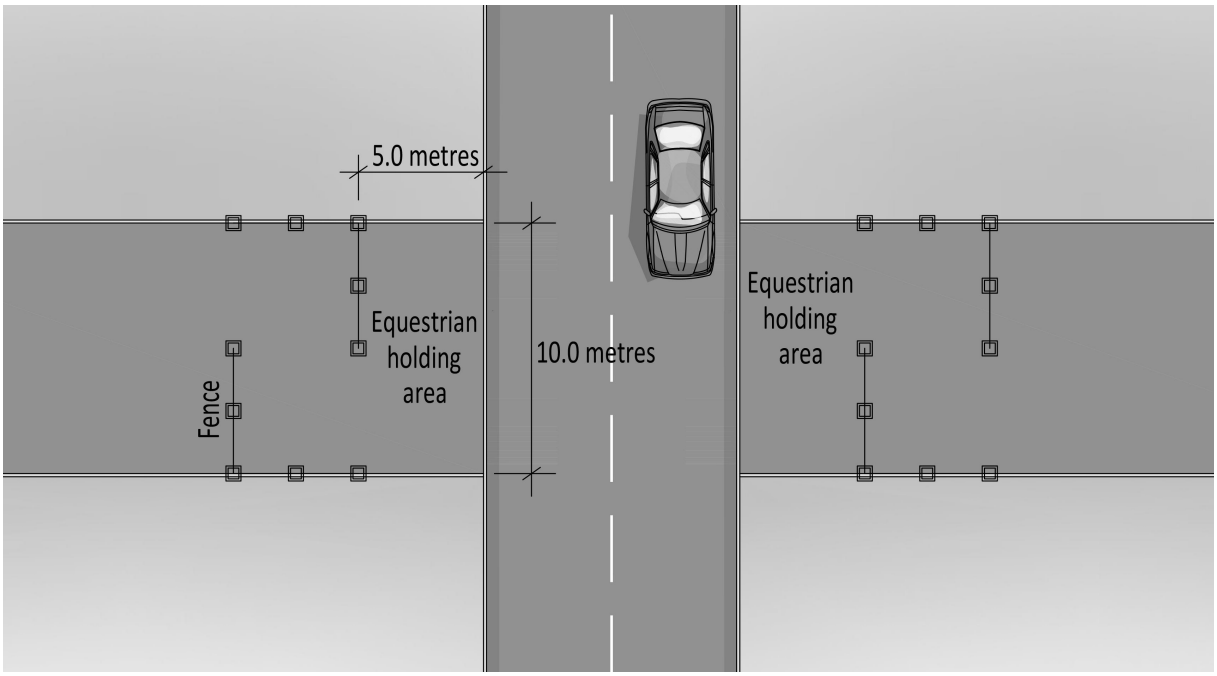
5.24 Where at-grade equestrian crossings are provided, a fenced, grassed holding area of 10.0 metres wide by 5.0 metres long shall be provided in the verge.

NOTE 1 When crossing the carriageway at-grade, a holding area can be beneficial as a horse can be startled or become impatient waiting for long periods.

NOTE 2 Staggered approaches to at-grade crossings can be beneficial to prevent equestrians from moving straight across the road without checking for oncoming traffic.

NOTE 3 A drawing of a typical equestrian at-grade crossing holding area is shown in Figure 5.24N3.

Figure 5.24N3 Equestrian at-grade crossing holding area



5.24.1 Facilities associated with horse-riding routes i.e. bridle gates and/or horse stiles should be a minimum of 4.0 metres from the edge of the carriageway.

5.25 Where an at-grade equestrian crossing is provided on a dual carriageway, a holding area of 5.0 metres wide by 3.0 metres long shall be provided in the central reserve.

5.25.1 At-grade equestrian crossings should only be provided on dual carriageways where alternative crossings are not possible.

Subways on horse-riding routes

5.26 Where horse-riding routes are to be incorporated into subways, provision shall be in accordance with Table 5.26.

Table 5.26 Minimum dimensions for subways incorporating horse-riding routes

Minimum headroom (ridden)	Minimum headroom (led)	Minimum width
3.7 metres	2.7 metres	3.0 metres

5.26.1 A dismount sign and mounting blocks should be provided for equestrians where the headroom is less than 3.7 metres.

Lighting

5.27 For lighting of horse-riding routes within the highway extents, TD 501 [Ref 5.N] shall be used.

5.27.1 Horse-riding routes should not be lit where they are adjacent to an unlit highway.

5.27.2 Horse-riding routes in urban areas should be lit.

5.27.3 Horse-riding routes away from the highway extents in rural areas should not be lit unless high user flows are expected.

5.27.4 Any lighting columns or lit bollards should be sited a minimum of 0.5 metres back from the edge of horse-riding routes.

Drainage

5.28 For drainage of horse-riding routes within the highway extents CG 502 [Ref 6.N] shall be used.

5.28.1 Filter drains and french drains within the verge should be avoided on horse-riding or shared use routes because of the difficulty they cause to horses.

NOTE Drainage grates and utility covers can cause slipping problems for horses.

Surfacing

5.29 Surfacing for horse-riding routes shall be in accordance with Table 5.29.

Table 5.29 Surface options for horse-riding routes

Surface material	Adequacy scale	Construction details
Hot rolled asphalt surface course	3	25mm hot rolled asphalt wearing course (6mm aggregate size) on 60mm bituminous macadam base course on 150mm thick type 1 sub-base
Bituminous macadam surface course	2	25mm dense bitumen macadam wearing course on 60mm bituminous macadam base course on 150mm thick type 1 sub-base
Surface dressing on stone base or bitumen	2	Single coat gravel 3-6mm size 50mm dense bituminous macadam of 20mm aggregate size on 100-150mm type 1 granular material
Clay pavers	3	65mm thick on sand on 150mm type 1 sub-base
Concrete block flags	3	65mm thick blocks on 30mm sharp sand bed and 150mm type 1 sub-base
In situ concrete	2	40mm granolithic concrete on 75mm concrete on 150mm type 1 sub-base, surface to be textured to provide satisfactory skid resistance
Naturally binding stones and gravels	2	20mm depth limestone/hoggin (3mm dust) or other such as 50mm depth Breedon gravel (6mm dust) or 75mm depth Coxwell Gravel (30mm fines)
Sand	1	75mm sand on 150mm free draining layer
Wood chips	1	Chips laid to a compacted thickness of 225mm on free draining surface layer
Grassed gravel	1	150mm surface course of aggregate mixed with 25% topsoil on 150mm aggregate on geotextile sub-base
Reinforced turf	1	Rubber bonded fibre/grit sand laid on turf
Scalping/ballast with quarry waste	2/3	Maximum 40mm size with a high content of quarry waste laid (well compacted) on 150mm type 1 sub-base
Industrial waste products	1/2	100mm wearing course/150mm base course graded fuel ash/pulverised fuel ash/colliery shale/red shale
Road planings	2	Screened recycled road planings

NOTE 1 The surfacing adequacy scale is as follows:

1) 1 - excellent;

2) 2 - good; and

3) 3 - reasonable.

NOTE 2 Short grass or wood chip surfaces used for horse-riding routes lend themselves to a fast trot/canter by horses whereas macadam surfaces are only suitable for walking or a slow trot.

NOTE 3 Scalpings vary in quality and some can not be suitable for use on horse-riding routes.

5.30 Where unbound horse-riding route surfaces are provided, these shall include an edge restraint.

6. 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. CD 353, 'Design criteria for footbridges'
Ref 2.N	Highways England. CD 195, 'Designing for cycle traffic'
Ref 3.N	Department for Transport (UK Gov). Inclusive Mobility, 'Inclusive Mobility'
Ref 4.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 5.N	Highways England. TD 501, 'Road lighting'
Ref 6.N	Highways England. CG 502, 'The certification of drainage design'
Ref 7.N	Highways England. CA 185, 'Vehicle speed measurement'

7. Informative references

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

Ref 1.I	DETR - Dept of the Environment, Transport & Regions. PPU 1622RB, 'Guidance on the use of Tactile Paving Surfaces'

Road Layout
Design

CD 143
England National Application Annex to CD 143 Designing for walking, cycling and horse-riding

(formerly TA 90/05, TA 91/05, TA 68/96, TD 36/93)

Revision 1

Summary
This National Application Annex contains the Highways England specific requirements for designing for walking, cycling and horse-riding.

Feedback and Enquiries
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Contents

Release notes

Version	Date	Details of amendments
1	Mar 2020	Revision 1 (March 2020) Update to references only. Revision 0 (November 2019) Highways England National Application Annex to CD 143.

Foreword

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Introduction

Background

This National Application Annex gives the Highways England specific requirements and advice for the design of walking, cycling and shared use facilities on and/or adjacent to the motorway and all-purpose trunk road network.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 6.N] apply to this document.

Abbreviations

Abbreviations

Abbreviation	Definition
N/A	Not applicable

Terms and definitions

Terms and definitions

Term	Definition
Segregated facility	A shared use facility where the sections of the paved area allocated to different user groups are segregated from one another by a white line or physical feature.
Unsegregated facility	A shared use facility without segregation features.

E/1. Walking routes

Geometry

E/1.1 For crossfall and gradients on walking routes Inclusive Mobility [Ref 5.N] shall be used.

E/1.1.1 Adverse crossfall on bends should be avoided on walking routes.

Cross-sections

E/1.2 Widths for walking routes shall be in accordance with Table E/1.2.

Table E/1.2 Widths for walking routes

	No vertical features present either side	Vertical feature on one side and < 1.2 metres height	Vertical feature on one side and ≥ 1.2 metres height	Vertical features on both sides (distance per side)
Desirable minimum width	2.6 metres	+ 0.25 metres	+ 0.5 metres	0.25 metres for < 1.2 metres height 0.5 metres for ≥ 1.2 metres height
Absolute minimum width	2.0 metres			

NOTE *Walking routes include footways and footpaths.*

E/1.2.1 On walking routes, the separation from the carriageway should be at least 1.5 metres or 0.5 metres on roads with speed limits of 40 mph or less.

NOTE *Where a hard strip is provided on the carriageway, it can be considered as part of the separation distance for walking routes.*

Headroom on walking routes

E/1.3 Headroom for walking routes where obstructions are present shall be in accordance with Table E/1.3.

Table E/1.3 Headroom on walking routes

Length of obstruction	Headroom
Longer than 23.0 metres in length	2.6 metres
Up to and including 23.0 metres in length	2.3 metres

NOTE 1 *Table E/1.3 applies to general headroom such as clearance from overgrowth and other obstructions along a walking route.*

NOTE 2 *For headroom requirements at subways, see crossings.*

E/2. Cycling routes

E/2.1 CD 195 [Ref 2.N] shall be used for the design of cycle traffic only routes.

E/3. Shared use routes

Design speed

E/3.1 The design speed for routes shared by pedestrians, cyclists and equestrians shall be in accordance with Table E/3.1.

Table E/3.1 Design speeds for routes shared by pedestrians, cyclists and equestrians

User type	Primary user type	Design speed
Pedestrians/cyclists	Cyclists	30kph
Pedestrians/equestrians	Equestrians	Table 5.3 of CD 143 [Ref 3.N]
Cyclists/equestrians	Cyclists	30kph
Pedestrians/cyclists/equestrians	Cyclists	30kph

Alignment

E/3.2 The alignment of shared use routes shall allow for all potential users of the route.

E/3.2.1 Changes in horizontal alignment on shared use routes should be designed with simple horizontal curves rather than straight sections with occasional sharp curves.

NOTE *Sharp curves can reduce the available intervisibility between users; potentially leading to collisions.*

Crossfall

E/3.3 For crossfall on shared use routes, the crossfall values for footways in Inclusive Mobility [Ref 5.N] shall be used.

E/3.3.1 Adverse crossfall on bends should be avoided on shared use routes.

Cross-sections

E/3.4 Widths of segregated shared use routes shall be in accordance with Table E/3.4.

Table E/3.4 Widths of segregated shared use routes

	Routes segregated by a line or physical feature
Desirable minimum width	5.0 metres (3.0 metres cycling route and 2.0 metres walking route)
Absolute minimum width	3.0 metres (1.5 metres either side)

E/3.5 Widths of unsegregated shared use routes shall be a minimum of:

1) 3.0 metres where there are 200 users an hour or more; or
2) 2.0 metres where there are less than 200 users per hour.

E/3.5.1 On segregated and unsegregated shared use routes for pedestrians and cyclists, the separation from the carriageway should be a minimum of:

1) 1.5 metres on roads with a speed limit greater than 40mph; or
2) 0.5 metres on roads with speed limits of 40mph or less.

NOTE *Where a hard strip is provided on the carriageway, it can be considered as part of the separation distance for shared use routes.*

E/3.5.2 Where segregated and unsegregated shared use routes includes a horse-riding route, the separation from the carriageway should be at least 1.8 metres.

NOTE *Where a hard strip is provided on the carriageway, it can be considered as part of the separation distance for shared use routes.*

E/3.6 For cross-sections of walking, cycling and horse-riding routes on bridges, CD 353 [Ref 1.N] shall be used.

Headroom

E/3.7 The determining user type for headroom on shared use routes shall be in accordance with Table E/3.7.

Table E/3.7 Headroom by user type on shared use routes

Route type	Determining user type
Walking/cycling	Cyclists
Walking/horse-riding	Equestrians
Cycling/horse-riding	Equestrians
Walking, cycling and horse-riding	Equestrians

NOTE 1 *Headroom requirements for cyclists can be found in CD 195 [Ref 2.N].*

NOTE 2 *Headroom requirements for equestrians can be found in Section 5 of CD 143 [Ref 3.N].*

E/3.8 For headroom of walking, cycling and horse-riding enclosed overbridges, CD 353 [Ref 1.N] shall be used.

E/4. Crossings

Common elements

E/4.1 Uncontrolled crossings shall not be provided where slip road traffic joins or leaves the network in free flow conditions.

E/4.2 Where there is a parking demand, physical measures to prevent parking at pedestrian and cyclist crossings shall be included in the scheme design.

E/4.2.1 Protective posts may be provided to prevent parking at walking and cycling routes that are crossed by vehicular accesses to the carriageway.

E/4.2.2 Reflective material should be provided near the top of protective posts to help cyclists identify physical parking prevention measures during night time.

E/4.2.3 A yellow or white non-reflectorised band may be provided near the top of protective posts to help partially sighted pedestrians to see the posts.

Pedestrian crossings

E/4.3 For the assessment and design of pedestrian crossings LTN 1/95 [Ref 7.N] and LTN 2/95 [Ref 8.N] shall be used.

E/4.4 Stand-alone signal controlled crossings for pedestrians and cyclists shall not be provided where the 85th percentile speed exceeds 50mph.

E/4.5 Dropped kerbs shall be provided at pedestrian crossings.

Refuge islands

E/4.6 Refuge islands shall not be provided where the speed limit is greater than 40 mph except where the refuge island is incorporated into a single lane dualling design.

E/4.7 Table E/4.7 shall be used to determine the depth of pedestrian and shared use refuge islands, measured in the direction of travel of the pedestrian or cyclist.

Table E/4.7 Depth of pedestrian and shared use refuge islands

User type	Desirable minimum depth	Absolute minimum depth
Pedestrians	2.0 metres	1.5 metres
Shared use	3.0 metres	2.5 metres

E/4.7.1 The width of the pedestrian or shared use refuge island should not be less than the width of the connecting facility or less than 2.0 metres.

E/4.8 Dropped kerbs shall be provided at refuge islands.

E/4.8.1 Tactile surfaces should be provided at the dropped kerb approaches to pedestrian and shared use refuge islands and within the refuge island.

NOTE *Further information on tactile surfaces is available in Guidance on the use of Tactile Paving Surfaces PPU 1622RB [Ref 1.I].*

Subways

E/4.9 Cross-sections and headroom of pedestrian subways shall be provided in accordance with Table E/4.9.

Table E/4.9 Minimum pedestrian subway dimensions

Type of subway	Length of subway	Height	Width
Wide	N/A	2.6 metres	5.0 metres
Normal	< 23.0 metres	2.3 metres	3.0 metres
	≥ 23.0 metres	2.6 metres	3.3 metres
Narrow	N/A	2.3 metres	2.3 metres

NOTE 1 *Wide subways are where a subway forms an extension to a footway system carrying a large number of pedestrians.*

NOTE 2 *Normal subways are suitable for the majority of situations.*

NOTE 3 *Narrow subways are for small numbers of pedestrians where normal subways cannot be justified on cost grounds.*

E/4.9.1 The longitudinal gradient of the subway should be no less than 0.7% to allow for drainage.

E/4.9.2 In subways forward visibility of 4.0 metres or more should be provided at corners and changes of direction for pedestrians.

NOTE *For the purposes of determining visibility provision at corners and changes of direction in subways, pedestrians can be assumed to be 0.4 metres away from an adjacent vertical wall.*

E/4.9.3 In subways the forward visibility envelope should extend from a height of 1.5 metres (representative of an adult) to 0.6 metres (for a child).

NOTE *Inside corners rounded off to a radius of 4.6 metres meet the forward visibility criteria in subways.*

E/4.9.4 Access ramps or stairs should be the same width as the subway.

E/4.9.5 On stairs and ramps at subways, handrails should be provided:

1) on both sides of the stairs and ramps, at a distance of 45 mm from the wall;
2) with a central handrail where the width of stairs or ramps exceeds 3.0 metres;
3) at a height of 1.0 metre above the level surface;
4) at a height of 0.9 metres above a ramp;
5) at a height of 0.85 metres above the nose of a step;
6) with a handrail cross section of between 45 mm and 55 mm in diameter.

E/4.9.6 On stairs and ramps at subways, landings should be provided:

1) at changes in direction and changes in gradient;
2) at intervals where the total rise is no greater than 3.5 metres (even on straight ramps);
3) which are the same width as the ramp or stairs;
4) a minimum of 2.0 metres long, measured along the centre line of the landing;
5) that are horizontal;
6) that are adequately drained.

E/4.9.7 Pedestrian ramps and stairs should both be provided for access to pedestrian subways.

E/4.9.8 Ramps should have a maximum gradient of 5%, or a maximum gradient of 10% for short distances only where significant constraints exist.

E/4.10 Table E/4.10a and Table E/4.10b shall be used for dimensions for straight and helical stairs.

Table E/4.10a Dimensions for straight stairs

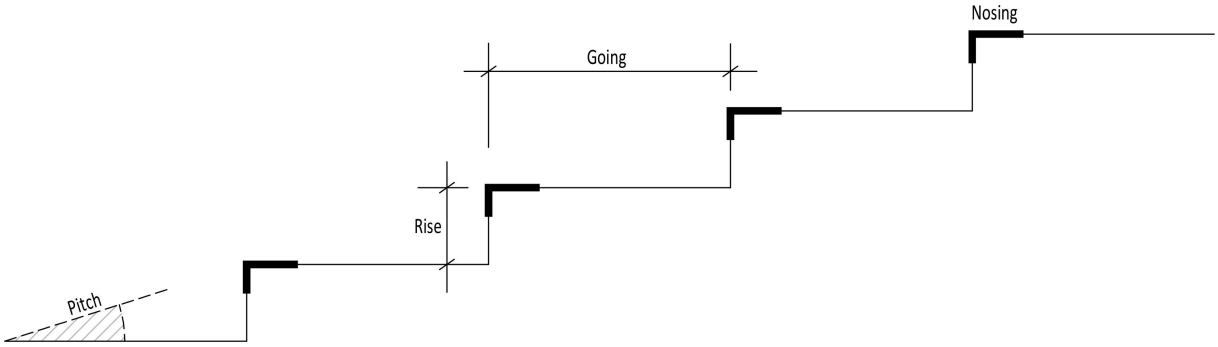
Rise			Going			Pitch	
Minimum	Maximum	Optimum	Minimum	Maximum	Optimum	Maximum	Optimum
100 mm	150 mm	130 mm	280 mm	350 mm	300 mm	33 degrees	27 degrees

Table E/4.10b Dimensions for helical stairs

Rise (r)	Going (g)			2r + g	
	Minimum inner going	Centre going	Maximum outer going	Minimum	Maximum
150-190 mm	150 mm	250 mm	450 mm	480 mm	800 mm

NOTE *Figure E/4.10N provides a diagram of stair elements.*

Figure E/4.10N Stair elements



E/4.10.1 The following criteria should be applied to straight and helical stairs:

1) headroom between any ceiling and stair measured vertically to be no less than the height of the subway;
2) stair flights to comprise no more than 20 steps between landings, or 9 steps where dedicated facilities other than steps are not provided;
3) landings to be the same width as the stair;
4) landing depth to be 1.8 metres deep;
5) not be more than 3 successive flights of stairs without a change of direction of 30 degrees or more at a landing;
6) all landings to be horizontal;
7) all landings to be adequately drained;
8) stair pitch to be uniform with steps of equal rise;
9) nosings on the stairs to be rounded to a 6 mm radius without overhang;
10) nosings on the stairs to be colour contrasted from the rest of the step.

E/4.10.2 For helical stairs central structural columns should be slender to avoid places of concealment.

Shared use pedestrian and cyclist facilities in subways

E/4.11 In subways, unsegregated pedestrian and cyclist provision shall be provided in accordance with Table E/4.11.

Table E/4.11 Minimum dimensions for unsegregated subways for pedestrians and cyclists

Subway length	Height	Width	
		Desirable minimum	Absolute minimum
< 23.0 metres	2.4 metres	4.0 metres	3.0 metres
≥ 23.0 metres	2.7 metres	4.0 metres	3.0 metres

E/4.12 In subways, segregated pedestrian and cyclist provision shall be provided in accordance with Table E/4.12.

Table E/4.12 Minimum dimensions for segregated subways for pedestrians and cyclists

Subway length	Height		Width		Additional width
	Cycling route	Walking route	Cycling route	Walking route	Between subway wall and cycling side of route
< 23.0 metres	2.4 metres	2.3 metres	2.5 metres	2.0 metres	0.5 metres
≥ 23.0 metres	2.7 metres	2.6 metres	2.5 metres	2.0 metres	0.5 metres

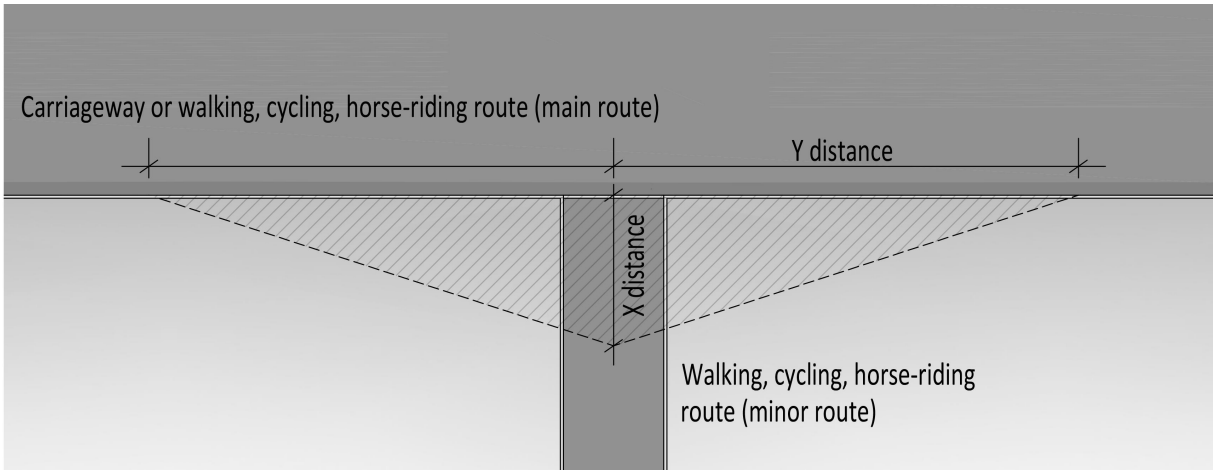
E/4.13 For gradients on bridges of shared use routes, CD 353 [Ref 1.N] shall be used.

E/5. Visibility at junctions and crossings

E/5.1 Visibility splays shall be provided for routes at junctions and crossings used by pedestrians, cyclists (on shared use facilities only) and equestrians where these users have to stop or give way.

NOTE *Figure E/5.1N provides a diagram of visibility splay "x" and "y" distances for walking, cycling and horse-riding routes.*

Figure E/5.1N Visibility splay 'x' and 'y' distances for walking, cycling and horse-riding routes



E/5.2 Visibility splay "x" distances for pedestrians, cyclists (on shared use facilities only) and equestrians at junctions and crossing points shall be provided in accordance with Table E/5.2.

Table E/5.2 Visibility "x" distance requirements at junctions

	Desirable minimum	Absolute minimum
Pedestrian	2.0 metres	1.5 metres
Shared use (pedestrians and cyclists)	4.0 metres	2.5 metres
Equestrians	5.0 metres	3.0 metres

NOTE *For cyclists at shared use crossings and junctions, the desirable minimum "x" distance equates approximately to the length of two cycles.*

E/5.3 Visibility splay "y" distance for pedestrians and cyclists (on shared use facilities only) at junctions and crossing points shall be provided in accordance with Table E/5.3.

Table E/5.3 Visibility "y" distance requirements at junctions

Minor route	Design speed on mainline	Main route			
		Mainline carriageway	Cycle track	Shared use route	Horse-riding route
Pedestrian-/cyclist	All	CD 123 [Ref 4.N]	CD 195 [Ref 2.N]	Table E/3.1	Table 5.3 of CD 143

NOTE *Requirements for "y" distances on shared use routes with equestrians can be found in Table 5.9 of CD 143.*

E/5.4 "Y" distances shall be measured from an eye height of 0.9 metres to 2.0 metres for pedestrians and 1.0 metre to 2.2 metres for cyclists.

E/5.5 When measuring "y" distances at junctions or crossings, the object height shall be taken as 0.26 metres to 2.0 metres.

E/6. Other design features

Lighting

E/6.1 TD 501 [Ref 9.N] shall be used for the lighting of walking, cycling and horse-riding routes within the highway extents.

E/6.1.1 Walking, cycling and horse-riding routes should not be lit where they are adjacent to an unlit highway.

E/6.1.2 Walking, cycling and horse-riding routes in urban areas should be lit.

E/6.1.3 Walking, cycling and horse-riding routes away from the highway extents in rural areas should not be lit unless:

1) high user flows are expected;
2) routes are expected to be used as school or commuter routes.

E/6.1.4 Any lighting columns or bollards should be sited a minimum of 0.5 metres back from the edge of the walking, cycling and horse-riding routes.

E/6.1.5 Underpasses should be lit where there is a perceived risk to personal security.

Drainage

E/6.2 For drainage of walking cycling and horse-riding routes within the highway extents CG 502 [Ref 10.N] shall be used.

E/6.2.1 Filter drains and french drains within the verge should be avoided on shared use routes because of the difficulty they cause to horses.

Surfacing

E/6.3 Surfacing for walking and cycling routes shall be in accordance with Table E/6.3.

Table E/6.3 Surface options for walking and cycling routes

Surface material	Adequacy scale		Construction details
	Walking route	Cycling route	
Hot rolled asphalt surface course	1	1	25mm hot rolled asphalt wearing course (6mm aggregate size) on 60mm bituminous macadam base course on 150mm thick type 1 sub-base
Bituminous macadam surface course	1	1	25mm dense bitumen macadam wearing course on 60mm bituminous macadam base course on 150mm thick type 1 sub-base
Surface dressing on stone base or bitumen	1	1	Single coat gravel 3-6mm size 50mm dense bituminous macadam of 20mm aggregate size on 100-150mm type 1 granular material
Clay pavers	4	3	65mm thick on sand on 150mm type 1 sub-base
Concrete block flags	1	1	65mm thick blocks on 30mm sharp sand bed and 150mm type 1 sub-base
In situ concrete	1	2	40mm granolithic concrete on 75mm concrete on 150mm type 1 sub-base, surface to be textured to provide satisfactory skid resistance
Naturally binding stones and gravels	2	2	20mm depth limestone/hoggin (3mm dust) or other such as 50mm depth Breedon gravel (6m m dust) or 75mm depth Coxwell Gravel (30mm fines)
Sand	3	4	75mm sand on 150mm free draining layer
Wood chips	2	4	Chips laid to a compacted thickness of 225mm on free draining surface layer
Grassed gravel	1	3	150mm surface course of aggregate mixed with 25% topsoil on 150mm aggregate on geotextile sub-base
Reinforced turf	2	3	Rubber bonded fibre/grit sand laid on turf
Scalping/ballast with quarry waste	2	2	Maximum 40mm size with a high content of quarry waste laid (well compacted) on 150mm type 1 sub-base
Industrial waste products	2	3	100mm wearing course/150mm base course graded fuel ash/pulverised fuel ash/colliery shale/red shale
Road planings	1	1	Screened recycled road plannings

NOTE 1 The surfacing adequacy scale is as follows:

1) 1 - excellent;

2) 2 - good;

3) 3 - reasonable; and

4) 4 - inadequate.

NOTE 2 *Longitudinal and transverse surface defects on walking and cycling routes can result in trip hazards for pedestrians and loss of control for cyclists.*

NOTE 3 *Surfacing requirements for horse-riding routes can be found in Section 5 of CD 143.*

E/6.4 Where unbound walking or shared use route surfaces are provided, these shall include an edge restraint.

E/7. 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. CD 353, 'Design criteria for footbridges'
Ref 2.N	Highways England. CD 195, 'Designing for cycle traffic'
Ref 3.N	Highways England. CD 143, 'Designing for walking, cycling and horse riding (vulnerable users)'
Ref 4.N	Highways England. CD 123, 'Geometric design of at-grade priority and signal-controlled junctions'
Ref 5.N	Department for Transport (UK Gov). Inclusive Mobility, 'Inclusive Mobility'
Ref 6.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 7.N	The Stationery Office. LTN 1/95, 'Local Transport Note 1/95 - The assessment of pedestrian crossings'
Ref 8.N	The Stationery Office. LTN 2/95, 'Local Transport Note 2/95 - The assessment of pedestrian crossings'
Ref 9.N	Highways England. TD 501, 'Road lighting'
Ref 10.N	Highways England. CG 502, 'The certification of drainage design'

E/8. Informative references

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

Ref 1.I	DETR - Dept of the Environment, Transport & Regions. PPU 1622RB, 'Guidance on the use of Tactile Paving Surfaces'

Department for Infrastructure
An Roinn Bonneagair

Road Layout
Design

CD 143
Northern Ireland National Application Annex to CD 143 Designing for walking, cycling and horse-riding

(formerly TA 90/05, TA 91/05, TA 68/96, TD 36/93)

Revision 0

Summary
This National Application Annex contains the Department for Infrastructure Northern Ireland requirements for designing for walking, cycling and horse-riding.

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

Version	Date	Details of amendments
0	Nov 2019	Department for Infrastructure Northern Ireland National Application Annex to CD 143.

Foreword

Publishing information

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

This document supersedes TA 90/05, TA 91/05, TA 68/96 and TD 36/93, which are 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 specific requirements and advice for the design of walking, cycling and shared use facilities on and/or adjacent to the motorway and all-purpose trunk road network.

Assumptions made in the preparation of this document

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

NI/1. Design of walking, cycling and shared use routes and associated facilities

NI/1.1 The Department for Infrastructure Northern Ireland shall be contacted regarding the design of routes and facilities for walking, cycling and shared use.

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'

Road Layout
Design

CD 143
Scotland National Application Annex to CD 143 Designing for walking, cycling and horse-riding

(formerly TA 90/05, TA 91/05, TA 68/96, TD 36/93)

Version 1.0.1

Summary
This National Application Annex contains the Transport Scotland specific requirements for designing for walking, cycling and horse-riding.

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

Latest release notes

Document code	Version number	Date of publication of relevant change	Changes made to	Type of change
CD 143	1.0.**1**	March 2021	Scotland NAA	Incremental change to notes and editorial updates

Document was amended in May 2020 to remove duplicate wording where the reference text stated 'roads for all'.

A new revision number was incorrectly not created at this time and no further changes have been made to this document since May 2020.

Previous versions

Document code	Version number	Date of publication of relevant change	Changes made to	Type of change
CD 143	1	January 2020		
CD 143	0	November 2019		

Foreword

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

This document supersedes TA 90/05, TA 91/05, TA 68/96 and TD 36/93, which are 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 and advice for the design of walking, cycling and shared use facilities on and/or adjacent to the motorway and all-purpose trunk road network.

Assumptions made in the preparation of this document

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

S/1. Design of walking, cycling and shared use routes and associated facilities

S/1.1 Transport Scotland's Roads for All [Ref 3.N] and Cycling by Design [Ref 1.N] shall be used for the design of routes and facilities for walking, cycling and shared use.

NOTE *Requirements for the assessment of walking, cycling and horse riding routes are addressed in GG 142 [Ref 4.N].*

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	Transport Scotland. Cycling by Design, 'Cycling by Design'
Ref 2.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 3.N	Transport Scotland. Roads for All, 'Roads for All - Good Practice Guide for Roads'
Ref 4.N	Highways England. GG 142, 'Walking, cycling and horse-riding assessment and review'

Llywodraeth Cymru
Welsh Government

Road Layout
Design

CD 143
Wales National Application Annex to CD 143 Designing for walking, cycling and horse-riding

(formerly TA 90/05, TA 91/05, TA 68/96, TD 36/93)

Revision 0

Summary
This National Application Annex contains the Welsh Government specific requirements for designing for walking, cycling and horse-riding.

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.

Contents

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0	Nov 2019	Welsh Government National Application Annex to CD 143.

Foreword

Publishing information

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

This document supersedes TA 90/05, TA 91/05, TA 68/96 and TD 36/93, which are 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 specific requirements and advice for the design of walking, cycling and shared use facilities on and/or adjacent to the motorway and all-purpose trunk road network.

Assumptions made in the preparation of this document

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

W/1. Design of walking, cycling and shared use routes and associated facilities

W/1.1 Active Travel (Wales) Act Design Guidance ATDG (W) [Ref 1.N] shall be used for the design of routes and facilities for walking, cycling and shared use.

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	Welsh Government. ATDG (W), 'Active Travel (Wales) Act Design Guidance'
Ref 2.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'