

INTERIM ADVICE NOTE 150/14 Revision 02

Guidance on Alternative Temporary Traffic Management Techniques for Relaxation Works on Dual Carriageways

Summary

Guidance for temporary traffic management (TTM), on the approach zones at road works where “relaxation scheme” works criteria apply, in order to reduce risks to road workers.

This IAN introduces optional alternative TTM techniques which reduce the number of advance warning signs provided on the approach to road works on dual carriageways.

Instructions for Use

This document is supplementary to (but does not replace any elements of) the existing guidance provided in the DfT Traffic Signs Manual – Chapter 8

IAN 150/11 dated Dec 2011 was withdrawn from use on Thurs 29.11.12.

IAN 150/12 dated Nov 2012 (revised Nov 2013) was withdrawn from use on Wed 05.03.14.

IAN 150/14 published March 2014 was withdrawn from use July 2014

IAN 150/14 Revision 01 dated July 2014

This document supersedes IAN150/14 Revision 01 which is withdrawn with immediate effect.

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Interim
Advice

Executive Summary

The Highways Agency (HA) has set out its overarching Aiming for Zero (AfZ) Strategy in April 2010. As part of this, the AfZ Road Worker Safety Strategy has an overall aim of significantly reducing health and safety risks to road workers, eliminating road worker fatalities and serious injuries and significantly reducing road worker personal injury accidents and “near miss incidents”.

The HA has carried out research projects, including on road trials of two alternative temporary traffic management (TTM) techniques which use a reduced number of advance warning signs provided on A frames at ground level, compared to the traditional TTM techniques shown in the plans in the DfT Traffic Signs Manual (TSM) Chapter 8.

One of these alternative TTM techniques may be used if the eligibility criteria are met, instead of using one of the traditional TTM techniques shown in the plans in the TSM Chapter 8.

The service provider should determine whether an alternative TTM technique, or a traditional TTM technique, should be used at a specific location in accordance with a location specific risk assessment and consideration of all appropriate factors.

Alternative TTM Technique - Offside Signs Removal

The “nearside only lane closure and signing” technique for relaxation schemes on dual carriageways with five or more lanes, as described in TSM Chapter 8 Part 1: Design (2009) paragraph D6.13.11 may also be safely applied for selected relaxation schemes on two, three and four lane dual carriageways. It has also been shown that the principles in the “nearside only lane closure and signing” technique can be safely applied in the approach and lane change zones of these schemes, for a single nearside lane closure on a two, three or four lane dual carriageway, or closure of the two nearside lanes on a three or four lane dual carriageway, or closure of the three nearside lanes on a four lane dual carriageway. It has also been demonstrated that the “nearside only signing” principles can be safely applied to closure of a single offside lane on a two lane motorway with hard shoulder or a three or four lane dual carriageway, or closure of the two offside lanes on a three or four lane dual carriageway or closure of the three offside lanes on a four lane dual carriageway.

This IAN provides guidance to the service provider, with regard to the advance signing in the approach and lane change zones for relaxation scheme lane closures on dual carriageways with two or more lanes.

The Offside Signs Removal technique may be used for relaxation scheme closure of:

- a single nearside lane on a two, three or four lane dual carriageway (Annex B2); or
- two nearside lanes on a three or four lane dual carriageway (Annex B4); or
- three nearside lanes on a four lane dual carriageway (Annex B6); or
- a single offside lane on a two lane motorway with hard shoulder (Annex B8); or
- a single offside lane on a three or four lane dual carriageway (Annex B10); or
- two offside lanes on a three or four lane dual carriageway (Annex B12); or
- three offside lanes on a four lane dual carriageway (Annex B14)

This means that, for these types of lane closure, there is no need to provide any offside TTM signs upstream of the taper, provided that the eligibility criteria described in this IAN are met.

By eliminating the need for all central reserve (offside) TTM signs for relaxation schemes, the time spent installing and removing TTM is reduced and live lane crossings by the HA

supply chain operatives are eliminated. This significantly reduces road worker risk without adversely affecting road user safety.

This IAN gives the supply chain the option to vary from the TSM Chapter 8 Part 1 relaxation scheme guidance provided in TSM Chapter 8 Part 1: Design Plans DZA3 and DZB6 (for a single nearside lane closure, or single offside lane closure) or in Plans DZA3 and DZB7 (for closure of the two or three nearside lanes, or the two or three offside lanes).

With immediate effect, provided that the eligibility criteria are met and where the service provider considers (based on an appropriate location specific risk assessment) that it is safe to do so, the “road works ahead” sign and distance plate (TSRGD 2002 sign diagrams 7001 & 572) and the “lane closed to traffic ahead” signs (TSRGD 2002 sign diagrams 7202 & 7208) may be omitted from the central reserve (offside), for a relaxation scheme requiring closure of:

- a single nearside lane on a two, three or four lane dual carriageway (Annex B2); or
- two nearside lanes on a three or four lane dual carriageway (Annex B4); or
- three nearside lanes on a four lane dual carriageway (Annex B6); or
- a single offside lane on a two lane motorway with hard shoulder (Annex B8); or
- a single offside lane on a three or four lane dual carriageway (Annex B10); or
- two offside lanes on a three or four lane dual carriageway (Annex B12); or
- three offside lanes on a four lane dual carriageway (Annex B14)

Alternative TTM Technique - Temporary Traffic Management Signs Simplification

This IAN provides guidance to the service provider, with regard to the advance signing in the approach and lane change zones for a single nearside lane closure, or a single offside lane closure, for relaxation schemes on a dual carriageway for which the national speed limit applies. This means that, for these types of lane closure, there is no need to provide the TTM advance warning signs at 200 yards and 600 yards upstream of the entry taper, provided that the eligibility criteria described in this IAN are met.

By reducing the need for certain specific nearside and offside TTM signs for relaxation schemes, the time spent installing and removing TTM is reduced and live lane crossings by the HA supply chain operatives is reduced. This significantly reduces road worker risk without adversely affecting road user safety.

This IAN gives the supply chain the option to vary from the TSM Chapter 8 Part 1 relaxation scheme guidance provided in Plans DZA3 and DZB6 (for a single nearside lane closure, or a single offside lane closure).

With immediate effect, provided that the eligibility criteria are met and where the service provider considers (based on an appropriate location specific risk assessment) that it is safe to do so, the “lane closed to traffic ahead” signs (TSRGD 2002 sign diagrams 7202 & 7208) may be omitted, from both the nearside and offside, at 600 yards and 200 yards upstream of the taper, and also the “Detail A” elements may be omitted (Table A.1.5 of the TSM Chapter 8) on the hard shoulder (where applicable) adjacent to the entry taper, for relaxation schemes involving a single nearside lane closure, or a single offside lane closure, on a dual carriageway for which the national speed limit applies.

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1. Introduction

1.1 Background

The Highways Agency (HA) has set out its overarching Aiming for Zero (AfZ) Strategy in April 2010. As part of this, the AfZ Road Worker Safety Strategy has an overall aim of significantly reducing health and safety risks to road workers, eliminating road worker fatalities and serious injuries and significantly reducing road worker personal injury accidents and “near miss incidents”.

The HA and service providers have carried out research to determine alternative ways of providing temporary traffic management (TTM) which have the potential to significantly improve road worker safety without adversely affecting road user safety. This research included on-road trials of alternative TTM techniques for relaxation schemes which use a reduced number of advance warning signs provided on A frames at ground level, compared to the traditional TTM techniques shown in the Plans in the DfT Traffic Signs Manual (TSM) Chapter 8. Details of this research can be found at Annexes A and C.

Any work activity involving installation, maintenance and removal of TTM on high speed roads is hazardous. The selection of the actual method of work should be made by a competent service provider and should reflect the risks of the planned work.

The omission of some temporary traffic signs from relaxation schemes will help the HA to fulfil its future vision for improving road worker safety, by significantly reducing risks to road workers involved in the installation, maintenance and removal of TTM.

This Interim Advice Note (IAN) has the potential to make a significant contribution towards the HA road worker safety strategy targets:

- achieve a substantial reduction in the need for road workers to cross live carriageways on foot.
- aim to eliminate the need for road workers to be on foot on the live carriageway.

1.2 Scope

This IAN provides guidance to service providers for alternative TTM techniques, in the approach zone and lane change zone, for relaxation schemes on dual carriageways. This document builds upon the guidance given in the Traffic Signs Manual Chapter 8 Part 1: Design and Part 2: Operations. In particular, this document builds on the guidance given in those sections of the TSM Chapter 8 dealing with relaxation schemes.

This IAN applies only to relaxation schemes on dual carriageways, including relaxation schemes which are being provided as part of major schemes. It does not apply to standard schemes.

This IAN applies to the HA network in England. Application of this document on any other road is subject to approval for its use being given by the appropriate Highway Authority.

This interim guidance makes two alternative techniques for relaxation schemes available for consideration by the service provider:

- Removal of all offside signs in advance of the taper when:
 - closing one nearside lane on a two, three or four lane dual carriageway for which the national speed limit applies; or
 - closing two nearside lanes on a three or four lane dual carriageway for which the national speed limit applies; or
 - closing three nearside lanes on a four lane dual carriageway for which the national speed limit applies; or

- closing one offside lane on a motorway with a hard shoulder for which the national speed limit applies; or
 - closing one or two offside lanes on a three or four lane dual carriageway for which the national speed limit applies; or
 - closing three offside lanes on a four lane dual carriageway for which the national speed limit applies.
- Removal of the 200yd and 600yd signs on both nearside and offside in advance of the taper plus omission of Detail 'A' when closing either one nearside or one offside lane on a dual carriageway for which the national speed limit applies.

This guidance is supplementary to (but does not replace any elements of) the existing guidance for TTM at road works, provided in the TSM Chapter 8, Parts 1 and 2.

The intention is that the guidance given in this document may be included within future revisions of the TSM Chapter 8.

1.3 Temporary Traffic Management Options

One of the two alternative techniques may be used if the eligibility criteria are met, instead of using one of the more traditional techniques shown in the Plans in the TSM Chapter 8.

The service provider should determine the most suitable TTM, in order to minimise safety risks to road workers to As Low As Reasonably Practicable, whilst managing safety risks to road users to a tolerable level. This is in accordance with the general principles applied in the Traffic Signs Manual Chapter 8.

The service provider should determine whether an alternative TTM technique or a more traditional TTM technique should be used at a specific location by carrying out a location specific risk assessment and considering the type of work being undertaken and all other appropriate factors such as those given in TSM Chapter 8 Part 1 2009 paragraphs D1.6.3 to D1.6.5, D3.8 and TSM Chapter 8 Part 2 2009 paragraphs O1.6.3 to O1.6.5, with the definition of "low traffic flows" given in TSM Chapter 8 Appendix A2.41. In all cases, the selection of traffic management technique should be based on a location specific risk assessment which considers the balance of risks between road users and road workers.

The table below provides guidance on the mitigation hierarchy for road worker risk. It should be noted that this table does not constitute a checklist from which techniques may simply be selected. It is intended to demonstrate the change in relative risk to road workers associated with the different alternative temporary traffic management techniques described in this IAN and so assist with determining possible approaches that could be used to manage these risks.

Table 1 Risk Mitigation Hierarchy for road workers

Risk mitigation hierarchy for road workers	Relaxation scheme requiring closure of nearside lane(s)			Relaxation scheme requiring closure of offside lane(s)		
	Single lane	Two lanes	Three lanes (Note 1)	Single lane (Note 2)	Two lanes	Three lanes (Note 1)
Technique with lower relative risk	Offside Signs Removal (Note 3) Refer to Annex B2	Offside Signs Removal (Note 3) Refer to Annex B4	Offside Signs Removal Refer to Annex B6	Offside Signs Removal Refer to Annex B8/B10	Offside Signs Removal Refer to Annex B12	Offside Signs Removal Refer to Annex B14
Decreasing ↑ Risk	Temporary Traffic Management Sign Simplification	-	-	Temporary Traffic Management Sign Simplification Refer to Annex D2	-	-
Technique with higher relative risk	Chapter 8	Chapter 8	Chapter 8	Chapter 8	Chapter 8	Chapter 8

Note 1: Closure of three nearside lanes, or three offside lanes, applies only to dual carriageways with four traffic lanes, including Smart Motorways all lane running.

Note 2: Closure of one offside lane applies only to motorways with a hard shoulder and two, three or four traffic lanes, including Smart Motorways all lane running or and three lane All Purpose Trunk Roads.

Note 3: Closure of one nearside lane on a five lane carriageway or one or two nearside lanes on a six lane carriageway may be carried out using the 'near side only lane closure and signing' technique given in the Traffic Signs Manual Chapter 8 Part 1: Design paragraph D6.13.11

1.4 Eligibility Criteria

The alternative techniques detailed in this document apply only to TTM which meets all of the generic eligibility criteria shown below:

- relaxation schemes, as defined in TSM Chapter 8.
- the permanent mandatory speed limit that would normally apply to the carriageway without road works is the national speed limit (as defined in TSM Chapter 8 Part 1: Design, paragraph D6.14.2).
- backlit sequentially flashing warning lamps shall be used in accordance with the requirements given in TSM Chapter 8 Part 2: Operations, paragraph O4.7.19.
- the service provider has carried out a suitable location specific risk assessment, which indicates that it is safe to implement the selected alternative technique.

The alternative technique “offside signs removal” applies only to TTM which meets all of the generic eligibility criteria given above and also meets the specific criteria below:

- the TTM plan used is consistent with drawing B2, B4, B6, B8, B10, B12 or B14 (in Annex B) in this IAN.
- prior to implementation of the closure of one nearside lane (drawing B2) the dual carriageway has two, three or four running lanes
- prior to implementation of the closure of two nearside lanes (drawing B4), the dual carriageway has three or four running lanes.
- prior to implementation of the closure of three nearside lanes (drawing B6), the dual carriageway has four running lanes.
- prior to implementation of the closure of one offside lane the dual carriageway is either:
 - a motorway with a hard shoulder and two running lanes (drawing B8); or
 - a dual carriageway with three or four running lanes (drawing B10)
- prior to implementation of the closure of two offside lanes (drawing B12), the dual carriageway has three or four running lanes
- prior to implementation of the closure of three offside lanes (drawing B14), the dual carriageway has four running lanes
- a minimum of one running lane will remain open during the works.

The alternative technique “TTM sign simplification” applies only to TTM which meets all of the generic eligibility criteria given above and also meets the specific criterion below:

- the TTM plan used is consistent with drawing D2 (at Annex D) in this IAN.

For the avoidance of doubt, it is not appropriate to use either alternative TTM technique:

- at a location where the permanent speed limit is less than the national speed limit; or
- for standard schemes; or
- on single carriageways.

1.5 Site specific risk assessment

A site specific risk assessment enables the risks to road workers and road users to be suitably identified and subsequently managed to a level that is as low as reasonably practicable.

The advice contained within this document is given on the basis that a service provider competent person carries out a suitable and sufficient site specific risk assessment, in accordance with the requirements and guidance in GD 04/12 in the Design Manual for Roads and Bridges, well before site works and ensures that it is appropriately recorded.

2. Guidance – Offside Signs Removal

2.1. Introduction

Section 2 of this IAN provides interim guidance to the service provider with regard to the advance signing in the approach and lane change zones for a single nearside lane closure for relaxation schemes on a dual carriageway with two, three or four lanes for which the national speed limit applies, or the closure of a single offside lane for relaxation schemes on a motorway with two lanes and a hard shoulder or on a dual carriageway with three or four lanes for which the national speed limit applies, or closure of two nearside or offside lanes for relaxation schemes on a dual carriageway with three or four lanes for which the national speed limit applies, or closure of three nearside or offside lanes for relaxation schemes on a dual carriageway with four lanes for which the national speed limit applies.

This interim guidance provides an alternative TTM technique where, for these types of lane closure, offside TTM signs upstream of the taper may be omitted, provided that all of the eligibility criteria described in section 1.4 in this IAN are met.

2.2 Issues

HA research and on road trials have shown that for relaxation schemes, on a dual carriageway where the national speed limit applies, all of the central reserve (offside) signs upstream of the taper, shown within the current TTM plan drawings within the TSM Chapter 8, may be removed without affecting the safety of road users. This alternative temporary signing arrangement eliminates one of the major risks to road workers, because it removes the need for road workers to cross the live carriageway to install, maintain and remove the signs on the central reserve, without any identifiably increased risk to road users. The installation of a sign on the central reserve usually means a road worker has to cross the carriageway three times, to carry the A frame, the sign and the sand bags, to the central reserve. In addition to the carriageway crossings, there is additional time needed for the road worker to be on the central reserve, to assemble the sign in position.

The service provider may consider this alternative TTM technique as an option when planning the TTM and assessing the risks and benefits of the various alternatives. The safety benefit that this alternative TTM technique can deliver for road workers is significant.

2.3 Removal of Offside TTM Signs

The “nearside only lane closure and signing” technique for relaxation schemes on dual carriageways with five or more lanes, as described in TSM Chapter 8 Part 1: Design (2009) paragraph D6.13.11, may also be safely applied to certain specified types of relaxation scheme on two, three and four lane dual carriageways. It has also been shown that the principles in the “nearside only lane closure and signing” technique can be safely applied in the approach zone of these schemes, for closure of:

- a single nearside lane on a two, three or four lane dual carriageway (Annex B2); or
- two nearside lanes on a three or four lane dual carriageway (Annex B4); or
- three nearside lanes on a four lane dual carriageway (Annex B6); or
- a single offside lane on a two lane motorway with hard shoulder (Annex B8); or
- a single offside lane on a three or four lane dual carriageway (Annex B10); or
- two offside lanes on a three or four lane dual carriageway (Annex B12); or
- three offside lanes on a four lane dual carriageway (Annex B14)

where the maximum flow is no more than 1200 vehicles per hour per lane left open throughout the period during which the relaxation scheme remains.

Therefore, with immediate effect, where the eligibility criteria described in section 1.4 in this document are met, the service provider may choose to omit the “road works ahead” sign and distance plate (TSRGD 2002 sign diagrams 7001 & 572) and the “lane closed to traffic ahead” signs (TSRGD 2002 sign diagrams 7202 & 7208) from the central reserve (offside).

- Annex B, section B1, shows the current TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for closure of a single nearside lane (adapted from Plans DZA3 and DZB6 in TSM Chapter 8 Part 1).
- Annex B, section B2, shows the alternative relaxation scheme plan for closure of a single nearside lane, with the central reserve (offside) signs omitted (adapted from Plans DZA3 and DZB6 in TSM Chapter 8 Part 1).
- Annex B, section B3, shows the current TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for closure of two nearside lanes (adapted from Plans DZA3 and DZB7 in TSM Chapter 8 Part 1).
- Annex B, section B4, shows the alternative relaxation scheme plan for closure of two nearside lanes, with the central reserve (offside) signs omitted (adapted from Plans DZA3 and DZB7 in TSM Chapter 8 Part 1).
- Annex B, section B5, shows the current TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for closure of three nearside lanes on a four lane carriageway (adapted from Plans DZA3 and DZB7 in TSM Chapter 8 Part 1).
- Annex B, section B6, shows the alternative relaxation scheme plan for closure of three nearside lanes on a four lane dual carriageway, with the central reserve (offside) signs omitted (adapted from Plans DZA3 and DZB7 in TSM Chapter 8 Part 1).
- Annex B, section B7, shows the current TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for closure of a single offside lane on a two lane motorway with hard shoulder (adapted from Plans DZA3 and DZB6 in TSM Chapter 8 Part 1).
- Annex B, section B8, shows the alternative relaxation scheme plan for closure of a single offside lane on a two lane motorway with hard shoulder, with the central reserve (offside) signs omitted (adapted from Plans DZA3 and DZB6 in TSM Chapter 8 Part 1).
- Annex B, section B9, shows the current TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for closure of a single offside lane on a three lane motorway with hard shoulder (adapted from Plans DZA3 and DZB6 in TSM Chapter 8 Part 1).
- Annex B, section B10, shows the alternative relaxation scheme plan for closure of a single offside lane on a three lane motorway with hard shoulder, with the central reserve (offside) signs omitted (adapted from Plans DZA3 and DZB6 in TSM Chapter 8 Part 1).
- Annex B, section B11, shows the current TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for closure of two offside lanes (adapted from Plans DZA3 and DZB7 in TSM Chapter 8 Part 1).
- Annex B, section B12, shows the alternative relaxation scheme plan for closure of two offside lanes, with the central reserve (offside) signs omitted (adapted from Plans DZA3 and DZB7 in TSM Chapter 8 Part 1).

- Annex B, section B13, shows the current TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for closure of three offside lanes (adapted from Plans DZA3 and DZB7 in TSM Chapter 8 Part 1).
- Annex B, section B14, shows the alternative relaxation scheme plan for closure of three offside lanes, with the central reserve (offside) signs omitted (adapted from Plans DZA3 and DZB7 in TSM Chapter 8 Part 1).

The relaxation scheme plans contained within the TSM Chapter 8 apply the general principle that signing for relaxation schemes is a subset of signing for standard schemes. This alternative TTM technique “Offside Signs Removal” is consistent with this principle, in that the central reserve (offside) signs can be reinstated if required to bring the TTM signing up to the level of a standard scheme TTM. This may be necessary, for example if weather or traffic conditions at the site deteriorate and this should be taken into account when planning the works.

Any decision to omit central reserve (offside) signing for relaxation schemes should take account of all appropriate factors, including traffic flows per hour per lane and the percentage of HGVs per hour per lane. Factors to be taken into account should include those given in TSM Chapter 8 Part 1 2009 paragraphs D1.6.3 to D1.6.5, D3.8 and TSM Chapter 8 Part 2 2009 paragraphs O1.6.3 to O1.6.5, with the definition of “low traffic flows” given in TSM Chapter 8 Appendix A2.41.

If appraisal of the aspects given in these sections of TSM Chapter 8 indicates that the omission of the central reserve (offside) signing is inadvisable, the use of other appropriate TTM, for example the current Chapter 8 relaxation scheme for a single lane closure, may need to be specified, as shown in TSM Chapter 8 Part 1 2009 Plan DZA3 / DZB6, a combined version of which is shown in Annex B, sections B1, B3, B5, B7, B9, B11 and B13 in this IAN.

Table 2 Lane closure options using the Offside Signs Removal technique.

	Relaxation scheme requiring closure of nearside lane(s)			Relaxation scheme requiring closure of offside lane(s)		
	Single nearside lane	Two nearside lanes	Three nearside lanes	Single offside lane	Two offside lanes	Three offside lanes
All Purpose Trunk Roads						
APTR 2L	Y	N/A	N/A	N	N/A	N/A
APTR 3L	Y	Y	N/A	Y	Y	N/A
Motorways						
D2M	Y	N/A	N/A	Y	N/A	N/A
D3M	Y	Y	N/A	Y	Y	N/A
D4M	Y	Y	Y	Y	Y	Y
D5M	Y	N	N	N	N	N
D6M	Y	Y	N	N	N	N
Smart Motorways						
SM3L	Y	Y	N/A	Y	Y	N/A
SM4L	Y	Y	Y	Y	Y	Y
SM5L	Y	N	N	N	N	N
SM6L	Y	Y	N	N	N	N

Y	= Allowed by IAN 150/14 Revision 02.
Y	= Allowed by Chapter 8 Part 1: Design paragraph D6.13.11
N	= Not an available option
N/A	= Not a possible option

3. Guidance – Temporary Traffic Management Signs Simplification

3.1. Introduction

Section 3 of this IAN provides interim guidance to the service provider, with regard to simplification of the advance signing in the approach and lane change zones for a single nearside lane closure, or a single offside lane closure for relaxation schemes on a dual carriageway for which the national speed limit applies.

This interim guidance provides an alternative TTM technique where, for these types of lane closures, specified nearside and offside TTM signs upstream of the taper may be omitted, provided that all of the eligibility criteria described in section 1.4 in this IAN are met.

3.2 Issues

HA research and on road trials have shown that for relaxation schemes on a dual carriageway where the national speed limit applies, some of the nearside and central reserve (offside) signs upstream of the taper, shown within the current TTM plan drawings within the TSM Chapter 8, may be omitted, without affecting the safety of road users. This alternative temporary signing arrangement significantly reduces one of the major risks to road workers, because it reduces the need for road workers to cross the live carriageway to install, maintain and remove the signs on the central reserve, without any identifiably increased risk to road users.

The service provider may consider this alternative TTM technique as an option when planning the TTM and assessing the risks and benefits of the various alternatives. The safety benefit that this alternative TTM technique can deliver for road workers is significant.

3.3 Omission of TTM Signs at 600 yards and 200 yards plus Detail 'A'

With immediate effect, where the eligibility criteria described in section 1.4 in this document are met, the service provider may choose to omit the "lane closed to traffic ahead" signs (TSRGD 2002 sign diagrams 7202 & 7208) from both the nearside and offside, at 600 yards and 200 yards upstream of the taper, and also the "Detail A" elements may be omitted (Table A.1.5 of the TSM Chapter 8) on the hard shoulder (where applicable) adjacent to the entry taper for a single nearside lane closure or a single offside lane closure on a dual carriageway for which the national speed limit applies.

- Annex D, section D1, shows the current TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for closure of a single offside lane (adapted from Plans DZA3 and DZB6 in TSM Chapter 8 Part 1).
- Annex D, section D2, shows the alternative relaxation scheme plan for closure of a single offside lane, with the signs omitted at 600 yards and 200 yards upstream of the taper (adapted from Plans DZA3 and DZB6 in TSM Chapter 8 Part 1).

The relaxation scheme plans, contained within the TSM Chapter 8, apply the general principle that signing for relaxation schemes is a subset of signing for standard schemes. This alternative TTM technique "Temporary Traffic Management Signs Simplification" is consistent with this principle, in that the nearside and central reserve (offside) signs can be reinstated if required to bring the TTM signing up to the level of a standard scheme TTM. This may be necessary, for example if weather or traffic conditions at the site deteriorate and this should be taken into account when planning the works.

Any decision to omit signing for relaxation schemes should take account of all appropriate factors, including traffic flows per hour per lane and the percentage of HGVs per hour per lane. Factors to be taken into account should include those given in TSM Chapter 8 Part 1

2009 paragraphs D1.6.3 to D1.6.5, D3.8 and TSM Chapter 8 Part 2 2009 section O1.6.3 to O1.6.5, with the definition of “low traffic flows” given in TSM Chapter 8 Appendix A2.41.

If appraisal of the aspects given in these sections of TSM Chapter 8 indicates that the omission of signing is inadvisable, the use of other appropriate TTM, for example the current Chapter 8 relaxation scheme for a single lane closure, may need to be specified, as shown in TSM Chapter 8 Part 1 2009 Plan DZA3 / DZB6, a combined version of which is shown in Annex B, sections B1, B3, B5, B7 and B9 and in Annex D, section D1 in this IAN.

4. Withdrawal Conditions

This IAN will remain in force until such time as this guidance can be incorporated permanently in to a future revision of the DfT Traffic Signs Manual Chapter 8, or superseded by revised HA guidance.

5. Training

5.1 Road worker training

Service providers should ensure that suitable and sufficient training is given to road workers. This training should include the following:

- (a) Safe use of works vehicles when using the TTM techniques described in this IAN.
- (b) Safe working when using the TTM techniques described in this IAN.

5.2 National Highway Sector Schemes

The development of an accredited training module for the Temporary Traffic Management techniques introduced by this IAN is ongoing. Training materials (including production of presentation material, the drafting of suitable test questions and where appropriate determining the assessment criteria) need to be developed and piloted before the training and assessment module can be provided to recognised training instructors and training bodies by the Awarding Organisation.

The training committee, which has been established by industry via National Highway Sector Scheme 12 for Temporary Traffic Management, is fully aware of these Temporary Traffic Management techniques and development work has been included in their current programme of work.

6. Contacts

Further information may be obtained from:

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Tel: 01234 796276.

GTN: 3013 6276.

Email: Standards_Feedback&Enquiries@highways.gsi.gov.uk

7. Normative References

- DfT Design Manual for Roads & Bridges GD 04/12 Standard for Safety Risk Assessment on the Strategic Road Network.
<http://www.dft.gov.uk/ha/standards/dmrb/vol0/section2/gd0412.pdf>
- DfT Traffic Signs Manual (TSM) Chapter 8 (2009) Traffic Safety Measures and Signs for Road Works and Temporary Situations, Part 1 – Design & Part 2 – Operations.
<https://www.gov.uk/government/publications/traffic-signs-manual>
- Statutory Instrument 2002 No. 3113 Traffic Signs Regulations and General Directions 2002 (TSRGD).
<https://www.gov.uk/government/policies/managing-improving-and-investing-in-the-road-network>

8. Informative References

8.1 Highways Agency - Aiming for Zero and Road Worker Safety

The following documents can be downloaded from the appropriate web site using the links provided:

- Highways Agency Aiming for Zero introduction.
<http://www.highways.gov.uk/our-road-network/safety/>
- Aiming for Zero overarching strategy. Road Worker Safety Strategy.
<http://www.highways.gov.uk/our-road-network/safety/road-worker-safety/>
- Guidance for Safer Temporary Traffic Management. 2002.
<http://webarchive.nationalarchives.gov.uk/+http://www.highways.gov.uk/aboutus/1091.aspx>

8.2 TRL Reports

The following documents are available from the HA Knowledge Compendium.

- TRL Report CPR 1242 (2011): Offside Signs Relaxation for Single Nearside Lane Closures - Results from monitored roll-out in HA Area 3, 2011.
- TRL Report CPR 1381 (2012): Offside Signs Relaxation for Closure of Two Nearside Lanes - Results from monitored roll-out in HA Area 2, 2012.
- TRL Report CPR 1736 (2013) - Offside Signs Relaxation for Closure of Three Nearside Lanes - Results from monitored roll-out in HA Area 5 on the M25, 2013.
- TRL Report CPR 1807 (2014) - Offside Signs Relaxation for Closure of Single Offside Lane- Results from monitored roll-out in HA Areas 4 and 10, 2014
- TRL Report RPN 2819 (2014) - Offside Signs Relaxation for Closure of Two Offside Lanes- Results from monitored roll-out in HA Area 5 on the M25, 2014
- TRL Report RPN 3177 (2014) - Offside Signs Relaxation for Closure of Three Offside Lanes- Results from monitored roll-out in HA Area 5 on the M25, 2014
- TRL Report RPN 479 (2009) - Driver Interaction with Temporary Traffic Management.

- TRL Report RPN 887 (2010) - Driver Interaction with Temporary Traffic Management Phase 2 Project Report -Simulation Trial.
- TRL Report RPN 1813 (2011) - Driver Interaction with Temporary Traffic Management Phase 1 Project Report – On Road Trials.

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Annex A: Background Information: Research and On-road Trials – Offside Signs Removal

The need for continuing provision of advance warning TTM signs on the central reserve (offside) during relaxation scheme works on dual carriageways with three or more lanes was investigated by both theoretical review and on-road trials, especially with regard to risks to road workers and road users.

A1 Highways Agency Report: “Safety Risk Perspective of Offside Signing”

This research examined the perceived worst-case scenario of omitting all central reserve (offside) signing, seeking to identify whether the change in risk for road users and road workers would be acceptable.

The work demonstrated that, despite the use of conservative assumptions in the research, it was considered unlikely that omission of offside signing would give rise to intolerable additional safety risk for road users and that the individual safety risk to road users arising from change (i.e. the omission of offside signs) would remain within the “broadly acceptable” region.

The report recommended that either an immediate change in guidance to service providers should be implemented, or that a trial period of removal of offside signing should be undertaken to further inform a decision on change in guidance to service providers.

A2 TRL Report CPR 1242 (2011): Offside Signs Relaxation for Nearside Lane Closures - Results from monitored roll-out in HA Area 3, 2011 (Stage 1)

Following the Safety Risk Perspective research work by the HA, a monitored on-road roll-out was carried out and funded by the service providers in Area 3, to examine the effect on driver behaviour of omitting all offside signs at the closure of a single nearside lane, during relaxation scheme works on motorways with three or more lanes, where the national speed limit applies.

On road trials were carried out in HA Area 3 and analysis of 120,000 data points for vehicles travelling through nearside lane closures with (control) and without (experimental) offside signs showed:

- The results from the statistical analysis provide robust statistical evidence that there is no difference in the lane movement of vehicles in the different experimental conditions.
- No hazardous manoeuvres or dangerous occurrences were observed throughout the 15 nights of experimental data collected.
- Operational feedback was that there was no discernible difference between the control and experimental conditions.

On the basis of this data, the monitored roll-out provided a strong indication that the extension of the offside signing relaxation technique to single lane closures on three lane dual carriageways presents no additional safety risk to road users.

A3 TRL Report CPR 1381 (2012): Offside Signs Relaxation for Closure of Two Nearside Lanes- Results from monitored roll-out in HA Area 2, 2012 (Stage 2a)

Following on from the successful on road trials in Area 3, of a single nearside lane closure, a monitored on-road roll-out was carried out in Area 2, to examine the effect on driver behaviour of omitting all offside signs at the closure of two nearside lanes. This work was carried out and funded by the Supply Chain.

On road trials were carried out in HA Area 2 and analysis of 110,000 data points for vehicles travelling through closures with two nearside lanes closed, with (control) and without (experimental) offside signs showed:

- The on-road monitored roll-outs found no evidence to suggest that omission of offside signing for a Lane 1 & 2 closure on a three lane carriageway results in any statistically significant difference in the lane movement of vehicles in the 800m before the works when compared to TSM Chapter 8 relaxation scheme signing.
- Visual analysis of video data suggested that no 'significant dangerous occurrences' were identified.
- There were no reported incidents or cone strikes during the trials.

On the basis of this data, the monitored roll-out provided a strong indication that the extension of the offside signing relaxation technique to two nearside lane closures on three lane dual carriageways presents no additional safety risk to road users.

A4 TRL Report CPR 1736 (2013): Offside Signs Relaxation for Closure of Three Nearside Lanes - Results from monitored roll-out in HA Area 5 on the M25, 2013 (Stage 4a2)

The successful on-road trials in Area 3, of a single nearside lane closure, and in Area 2, of a two nearside lane closure, enabled the publication of IAN150/12, enabling the use of these alternative TTM techniques. Building on this success, a monitored on-road roll-out was carried out in Area 5, to examine the effect on driver behaviour of omitting all offside signs at the closure of three nearside lanes on a four lane dual carriageway.

On road trials were carried out in HA Area 5 and analysis of 88,000 data points for vehicles travelling through closures with three nearside lanes closed, with (control) and without (experimental) offside signs showed:

- The on-road monitored roll-outs found omitting offside signing for a Lane 1, 2 & 3 closure on a four lane dual carriageway results in a difference that is not statistically significant at the 95% level but which is approaching significance when compared to TSM Chapter 8 relaxation scheme signing.
- Further comprehensive analysis of the data from this trial carried out to understand the change when the signs are omitted showed the primary change in behaviour took place in Lane 3, with the merge profile shifting around 200m closer to the taper.
- This means that drivers in Lane 3 start exiting the lane from around 670m before the lane actually starts to close, a distance comparable to closed lane behaviour seen in other lanes and in other trials.
- Previous HA research identified how and from where drivers react to sequentially flashing warning (road danger) lamps installed onto tapers; in this trial the three lane taper was equipped with sequentially flashing lamps and results across all lanes support this earlier research.
- The trial therefore suggests that sequentially flashing warning lamps have a far greater influence on drivers (particularly those occupying lanes toward the offside) than the advanced signing when off side signs are removed.
- There were four reported incidents or cone strikes during the trials:
 - During the control layout one queue tail accident unrelated to the trial and two cone taper strikes by vehicles in Lane 1 were observed.
 - One involved clipping of a single cone by a vehicle in Lane 1 during use of the experiment layout.
- Visual analysis of video data suggested that no other 'significant dangerous occurrences' due to poor driver behaviour were identified.

On the basis of this data, the monitored roll-out provided a strong indication that the extension of the offside signing relaxation technique, given in IAN150/12, to closure of three nearside lanes on four lane dual carriageways does change driver merge behaviour but that this change results in a level of safety risk to road users that still remains tolerable.

A5 TRL Report CPR 1807 (07 March 2014): Offside Signs Relaxation for Closure of Single Offside Lane - Results from monitored roll-out in HA Areas 4 and 10, 2013 (Stage 3)

Following the publication of IAN 150/12 and the trials of three nearside lanes using the offside signs removal technique, further on road trials were carried out in Areas 4 and 10 to examine the effect of offside signs removal on a closure of a single offside lane on a three lane carriageway.

The statistical analyses of the trial results showed that the lane occupancy pattern of vehicles moving across lanes at four different sign points (800yds, 600yds, 400yds and 200yds) did not vary in the control and experimental conditions. Therefore on-road monitored trials showed that there is no statistical evidence to suggest that omission of offside signing for a Lane 3 closure on a three lane carriageway results in any difference in the lane movement of vehicles when compared with either TSM Chapter 8 relaxation closures or the optional alternative signing provided in Interim Advice Note 150/12.

Small increases in the proportion of vehicles in lane 3, and possible increases in taper running, both associated with the experimental layout, suggested that monitoring of vehicles in lane 3 under operational conditions (particularly at 200m and nearer to the taper) should be given consideration.

Taking all findings into account, it is considered likely that the use of the OSSR advanced signing layout poses no greater risk to either road workers or road users than the relaxation signing layout typically used for the closure of a single offside lane on three lane dual carriageways / motorways with hard shoulder. The OSSR signing layout substantially reduces road workers' exposure to risk from crossing live carriageways. Therefore it is recommended that this layout be permitted for implementation.

However, since it has been identified in previous work that a major advanced warning for drivers in the offside lane (Lane 3 approaching the taper) is likely to be the taper itself (assuming it is equipped with sequential flashing road danger lamps) it is considered essential that any traffic management deployed using the OSSR technique for a Lane 3 closure should meet the following requirements:

- Sequential flashing road danger lamps, specified in Chapter 8 Section D3.12.2, should always be used.
- Any works should meet all of the visibility requirements specified in Chapter 8 Section D1.6.3.

A6 TRL Report RPN 2819 (13 March 2014): Offside Signs Relaxation for Closure of Two Offside Lanes - Results from monitored roll-out in HA Area 5 on the M25, 2013 (Stage 4a1)

Trials were carried out on the M25 DBFO to test whether removal of offside signs from the approach to a lane 3 and 2 (offside) closure on a dual carriageway / motorway with three lanes would cause a significant change in driver behaviour and lane choice.

The statistical analyses of the trial results showed that the pattern of vehicles moving across lanes at four different sign points (800yds, 600yds, 400yds and 200yds) varied slightly between the control and experimental conditions. Therefore on-road monitored trials showed that there is some statistical evidence to suggest that omission of offside signing for a lane 3

and 2 closure on a three lane carriageway results in a difference in the lane movement of vehicles when compared with the control condition (a Plan DZA3 relaxation scheme approach zone and Plan DZB7 relaxation scheme lane change zone). However when the analysis was re-run balancing for vehicle flow and day of the week the differences in movement across lanes at four different sign points became statistically non-significant. Nonetheless, small increases in the proportion of vehicles in lane 3, and possible increases in taper running, both associated with the experimental layout, suggest that the monitoring of vehicles in lane 3 under operational conditions (particularly at 200m and nearer to the taper) be given consideration.

Taking all findings into account, the use of the OSSR advanced signing does not substantially change driver behaviour and lane choice from the relaxation signing layout typically used for the closure of lanes 3 and 2 on three lane dual carriageways / motorways with hard shoulder. In addition, the OSSR signing layout substantially reduces road workers' exposure to risk from crossing live carriageways. Therefore it is recommended that this layout be permitted for implementation.

However, since it has been identified in previous work that a major advanced warning for drivers in the offside lane (lane 3 approaching the taper) is likely to be the taper itself (assuming it is equipped with sequential flashing road danger lamps), it is considered essential that any traffic management deployed using the OSSR technique for a lane 3 closure should meet the following requirements:

- Sequential flashing road danger lamps, specified in Chapter 8 Section D3.12.2, should always be used.
- Any works should meet all of the visibility requirements specified in Chapter 8 Section D1.6.3.

A7 TRL Report RPN 3177(23 October 2014): Offside Signs Relaxation for Closure of Three Offside Lanes - Results from monitored roll-out in HA Area 5 on the M25, 2014 (Stage 4a3)

Monitoring activity was carried out to determine whether removal of offside 'wicket' signs from the Chapter 8 'relaxation scheme' traffic management layout on the approach to a Lane 4-3-2 closure of a four-lane dual carriageway would cause a significant change in driver behaviour and lane choice.

The on-road trials used the proven methodology applied for previous Stages of the OSSR trials, which monitored driver behaviour through the advanced signing zone approaching the taper and allowed statistical analysis of driver lane choice. Additional analysis was undertaken to determine whether any incidents or occurrences took place, such as poor merging behaviour.

Analysis showed that the overall pattern of vehicles moving across lanes at the four different sign locations (800, 600, 400 and 200 m from the taper) did not vary significantly between control and experimental conditions. The proportion of vehicles in Lane 4 at the 200 m sign location was slightly higher in the experimental condition (1.7% of total traffic) than the control condition (0.6% of total traffic). There was also a slightly higher number of vehicles taper running in the experimental condition (0.12% of total traffic) than the control condition (0.09% of total traffic).

Examining the proportion of vehicles in Lane 4 at the 200m sign point that go on to taper run shows a major difference between the experimental and control conditions. Within the experimental condition, 7% of vehicles in Lane 4 at 200m ran the taper, compared to 15% of vehicles in Lane 4 at 200m for the control condition. This suggests the relative risk of vehicles in Lane 4 at the 200 m sign location running the taper is actually lower for the

experimental condition, despite the greater absolute number of vehicles observed at this location.

The statistical findings suggest that lane changing behaviour was not greatly influenced by the presence or absence of offside advanced wicket signing in the 800m upstream of the taper. In support of this conclusion, there were no incidents or occurrences noted during video analysis of either control or experimental closures, nor were there any incidents or occurrences (including taper strikes) reported by TTM crews or supervisors during the course of these trials.

On the balance of evidence, the use of the OSSR advanced signing has not been found to substantially change driver behaviour and lane choice from the relaxation signing layout typically used for the closure of Lanes 4, 3 and 2 on four-lane dual carriageways with hard shoulder. Therefore it is recommended that this layout be permitted for implementation.

However, it is considered essential that any traffic management deployed using the OSSR technique involving a Lane 4-3-2 closure should meet the following requirements:

- Sequential flashing road danger lamps, specified in Chapter 8 Section D3.12.2, should always be used.
- Any works should meet all of the visibility requirements specified in Chapter 8 Section D1.6.3.

A8 Extension of the OSSR technique via monitored roll-out

As part of the extension of OSSR, a monitored roll out (MRO) was carried out. The scenarios chosen for the MRO were selected low-risk options for OSSR that were indirectly supported by evidence obtained from previous trials and thus did not warrant a full on-road trial prior to their implementation.

Scenarios selected for the MRO were (with their supporting evidence):

- Single nearside lane closure on a two-lane motorway or All Purpose Trunk Road (based on evidence from OSSR Stage 1 and Stage 2a)
- Single offside lane closure on a four-lane motorway or All Purpose Trunk Road (based on evidence from OSSR Stage 3 and Stage 4a3)
- Closure of two offside lanes on a four-lane motorway or All Purpose Trunk Road (based on evidence from OSSR Stage 3, Stage 4a1 and Stage 4a3)

Closures of a single offside lane on a two-lane motorway or All Purpose Trunk Road were not initially included in the MRO. The closure of a single offside lane on a two-lane motorway was subsequently included (again based on evidence from OSSR Stage 3 and Stage 4a1), but the equivalent All Purpose Trunk Road scenario was not included due to the issues arising from the signing conflict arising when placing near side signs from Lane 1 of the carriageway.

The MRO was subsequently expanded to include closures of a single offside lane on a two-lane All Purpose Trunk Road but only where specific measures were taken to eliminate the signing conflict that arises during set-out of the advance “wicket” signs. The requirement was imposed that these specific measures to avoid signing conflict must be reported as part of the data from the MRO.

The evidence in support of the three core scenarios given above is that:

Single nearside lane closure on a two-lane motorway or All Purpose Trunk Road

- 773 reports of use on two-lane APTR plus 11 reports of use on two-lane motorway
- 14 reports were received for notable occurrences, of which five were incidents
- The traffic management layout was not a factor in any of the five incidents reported

Single offside lane closure on a four-lane motorway or All Purpose Trunk Road

- Six reports of use on four-lane motorway plus one report of use on four-lane APTR
- No reports were received for notable occurrences

Closure of two offside lanes on a four-lane motorway or All Purpose Trunk Road

- Sixteen reports of use on four-lane motorway
- No reports were received for notable occurrences

It should be noted that the four-lane motorway MRO was commenced some time after the two-lane motorway/APTR MRO was started, resulting in less data for the four-lane scenarios.

Nonetheless, data collected via the MRO appears to support the adoption of the scenarios selected based on previous data. Within the MRO to date, over 800 applications of OSSR have provided no evidence to suggest that the results from the previous trials cannot be applied to the three core scenarios. This would support the expansion of OSSR to include the three core scenarios and by extension that of the fourth scenario of a single offside lane closure on a two-lane motorway.

At present, the MRO has identified that applying OSSR to the fifth and final scenario, that of a single offside lane closure on a two-lane APTR, presents different risks compared to the current and expanded applications of OSSR. On that basis, the MRO does not support extending OSSR to include single offside lane closures on two-lane APTRs.

A9 Consultation: Road Worker Safety (RoWSaF) Working Group and Technical Project Board

The HA has consulted key internal and external stakeholders on this change in guidance to service providers and has considered any feedback received. The consultation group consisted of RoWSaF members plus other key stakeholders consulted via a “Technical Project Board”.

A10 Conclusions – Offside Signs Removal

The results of this research indicated that drivers behaved in a safe and consistent manner where offside signs were omitted. There were no significant changes in any safety critical behaviour by road users on the approach to road works.

The HA has accepted this alternative TTM technique “offside signs relaxation” as an operationally valid alternative to the current Chapter 8 TTM scheme arrangements shown in Plan DZA3, DZB6 and DZB7 of TSM Chapter 8 Part 1: Design 2009 for:

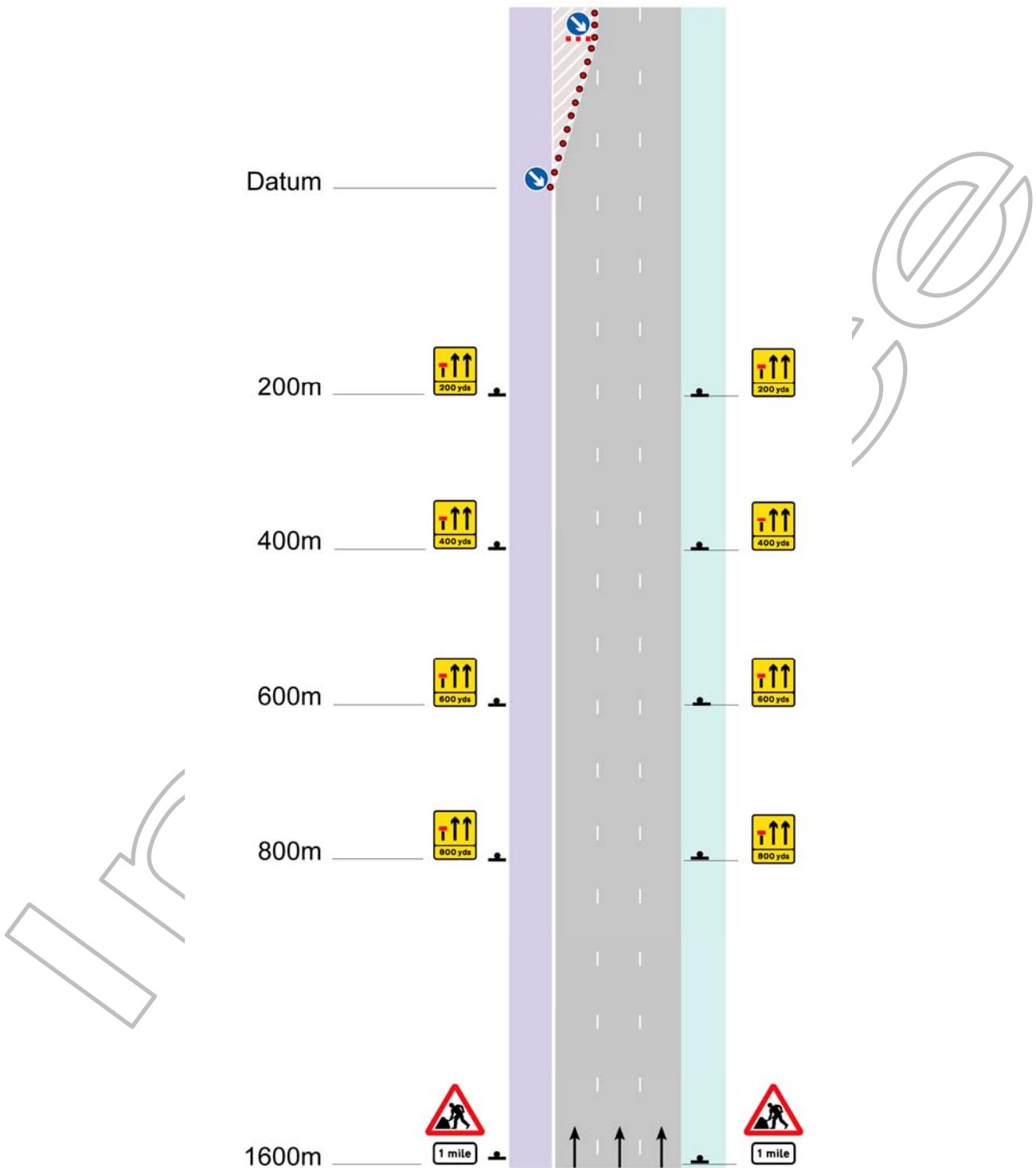
- relaxation scheme single nearside lane closures, closures of two nearside lanes or closure of three nearside lanes on a dual carriageway with two, three or four lanes for which the national speed limit applies, provided a single lane remains open; and
- relaxation scheme single offside lane closures on motorways with two lanes and a hard shoulder, or at closures of one, two or three offside lanes on a dual carriageway

with three or four lanes for which the national speed limit applies, provided a single lane remains open.

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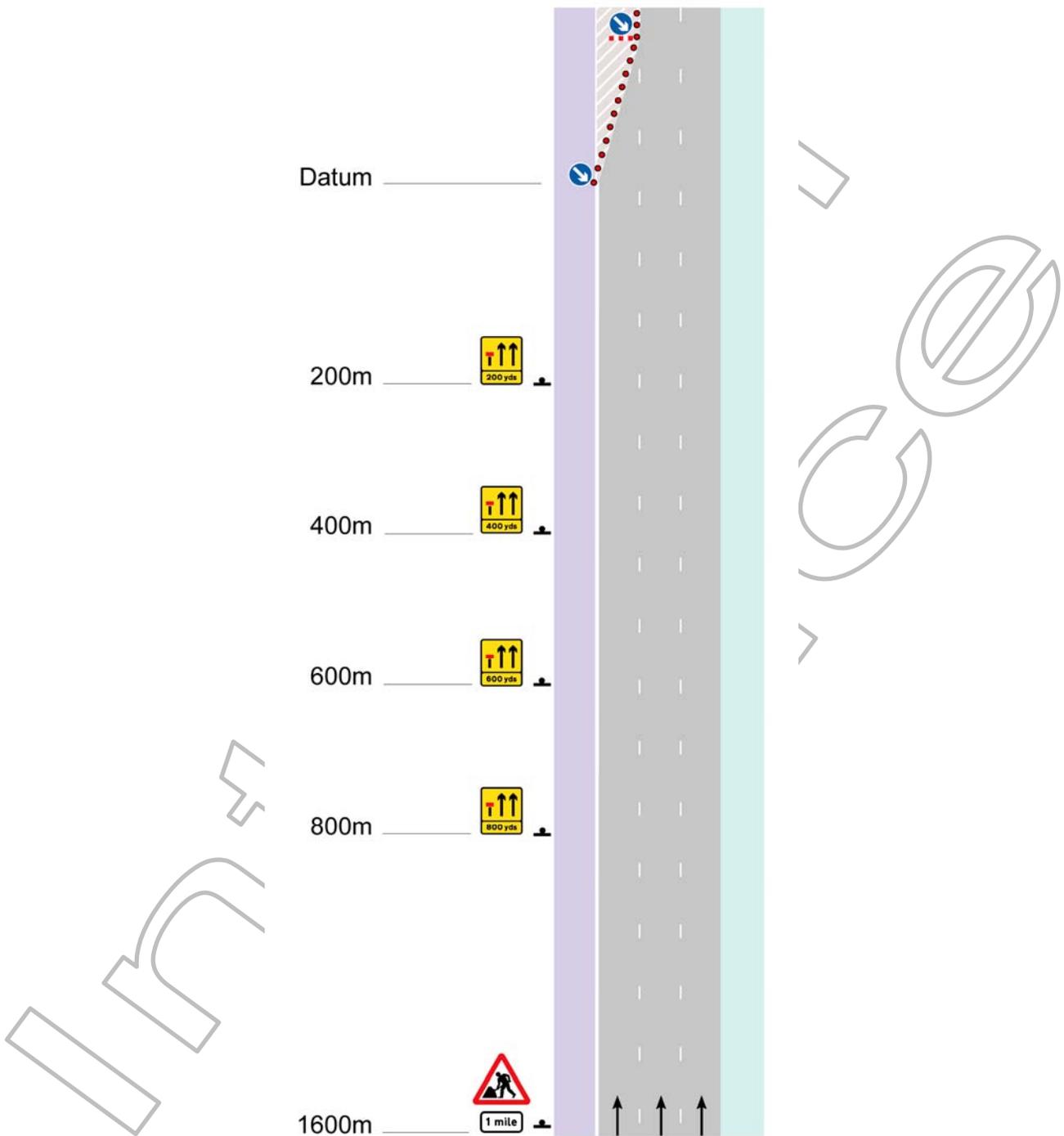
Annex B: TTM Plan Drawings - Offside Signs Removal

B1 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a single nearside lane closure on a dual carriageway road for which the national speed limit applies (adapted from Diagrams DZA3 and DZB6).



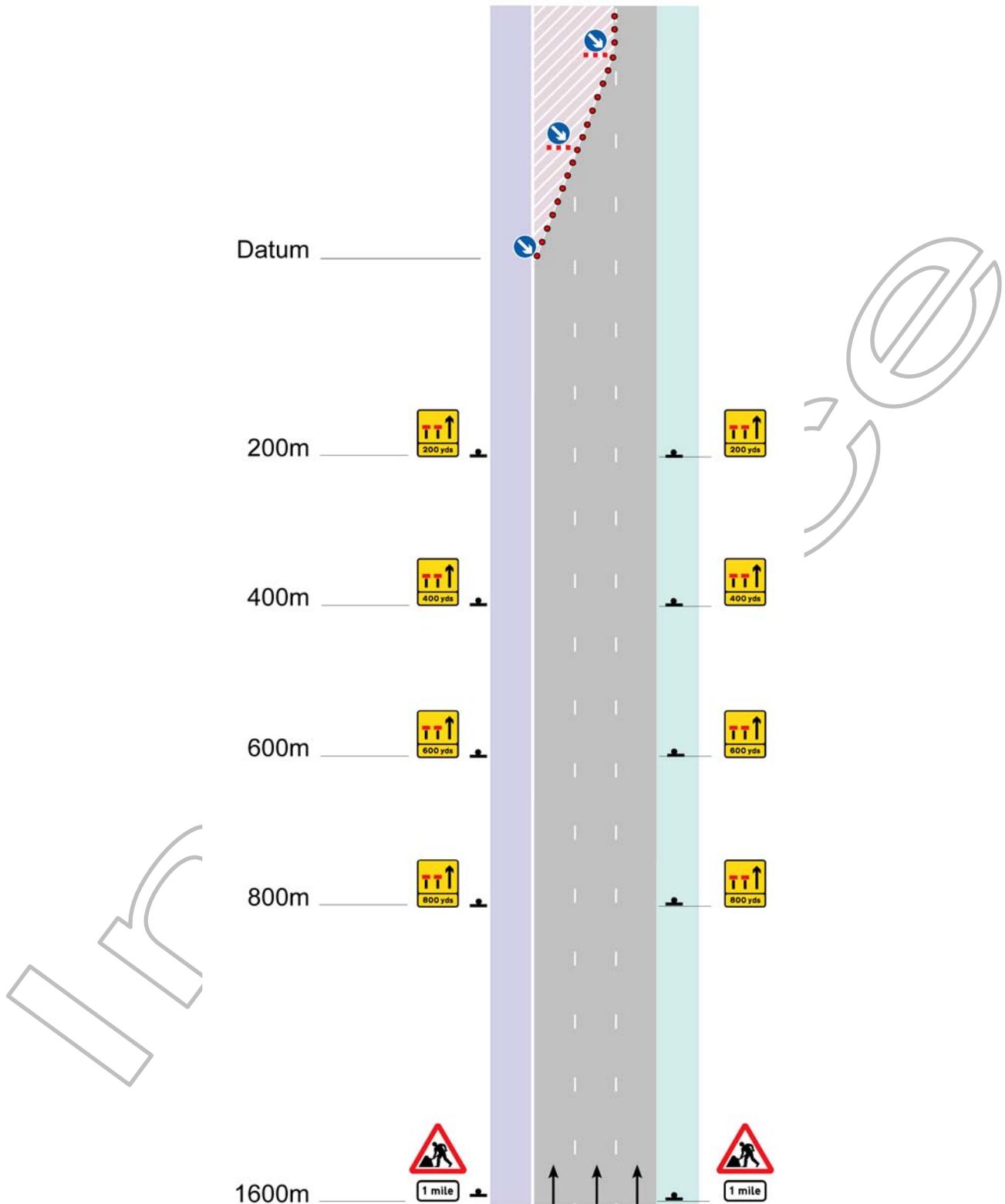
Note 1: The temporary mandatory speed limit signing has been omitted for clarity; where required, it should be placed at the distances from the datum shown in Plan DZB6, TSM Chapter 8 Part 1: Design 2009.

B2 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a single nearside lane closure on a dual carriageway road for which the national speed limit applies, where the central reserve (offside) signs are omitted (adapted from Diagrams DZA3 and DZB6).



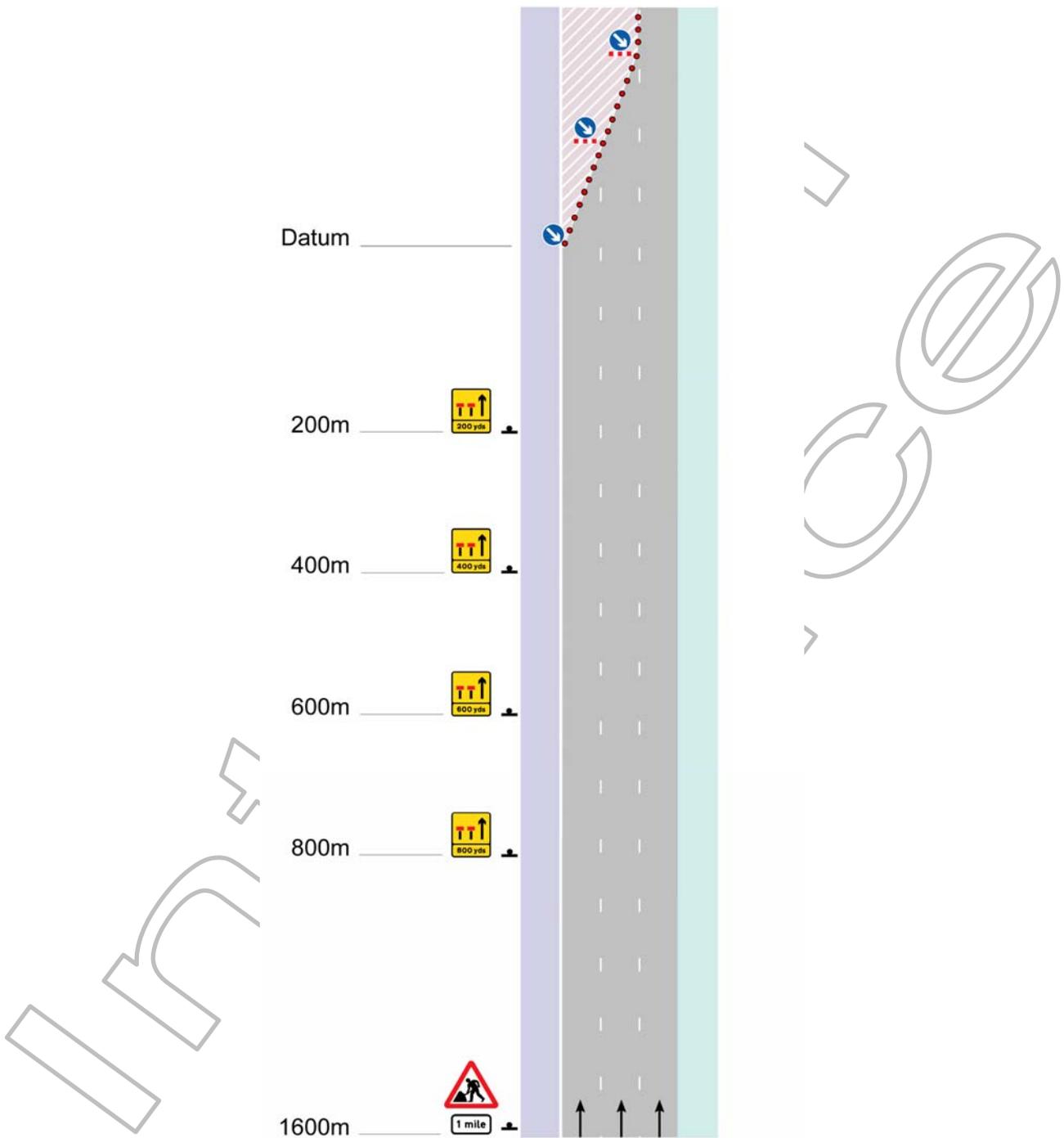
- Note 1:** This plan may only be used for a single nearside lane closure, for relaxation schemes on a dual carriageway with two, three or four lanes, where the national speed limit applies.
- Note 2:** Temporary mandatory speed limit signing has been omitted, but may be used with this plan; where required, it should be placed at the distances from the Datum shown in Plan DZB6, TSM Chapter 8 Part 1: Design 2009.
- Note 3:** Refer to section 1.4 Eligibility Criteria in this document.

B3 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a two nearside lane closure on a dual carriageway road for which the national speed limit applies (adapted from Diagrams DZA3 and DZB7).



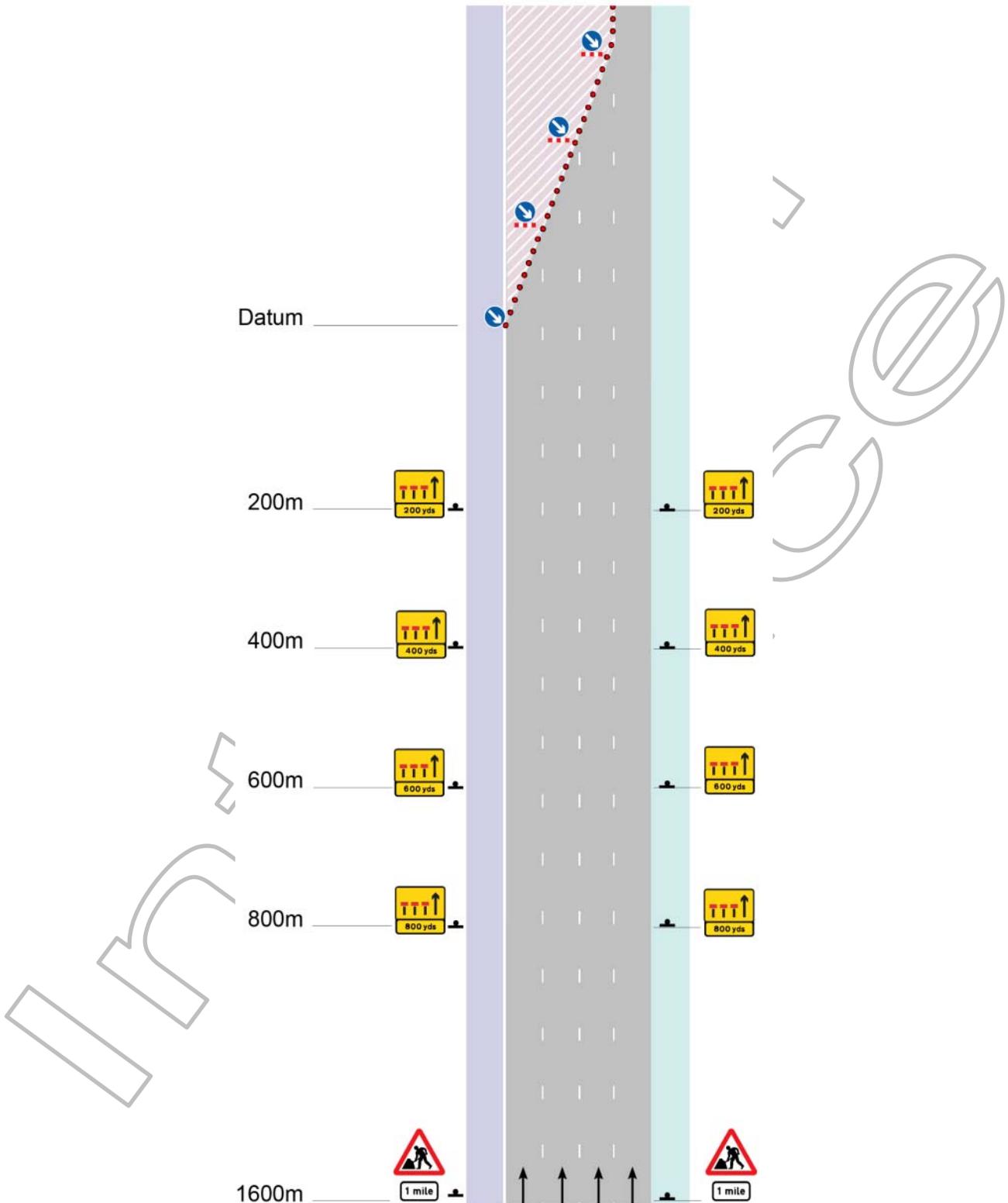
Note 1: The temporary mandatory speed limit signing has been omitted for clarity; where required, it should be placed at the distances from the datum shown in Plan DZB7, TSM Chapter 8 Part 1: Design 2009.

B4 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a two nearside lane closure on a dual carriageway road for which the national speed limit applies, where the central reserve (offside) signs are omitted (adapted from Diagrams DZA3 and DZB7).



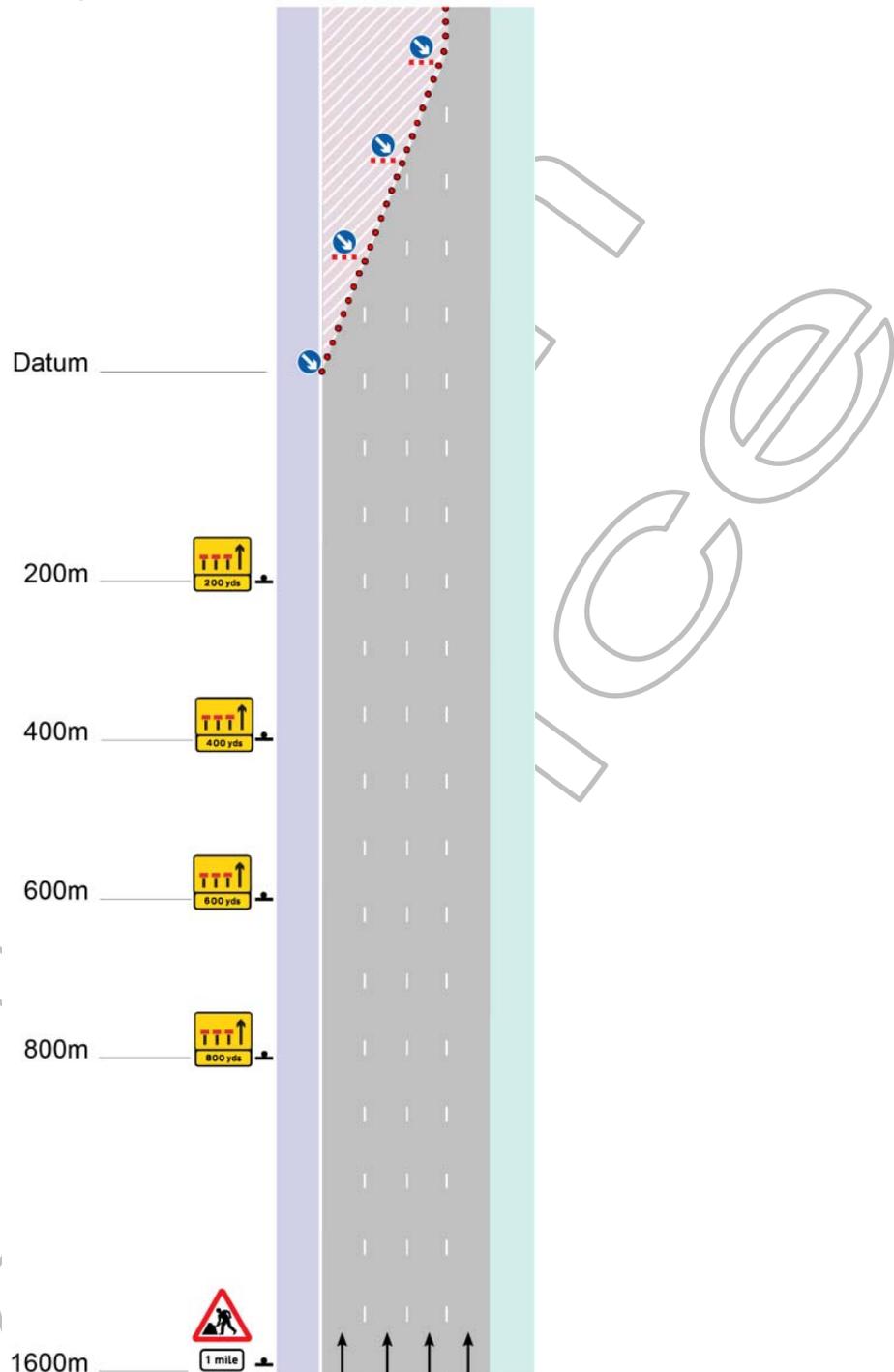
- Note 1:** This plan may only be used for a two lane nearside closure, for relaxation schemes on a dual carriageway with three or four lanes, where the national speed limit applies.
- Note 2:** Temporary mandatory speed limit signing has been omitted, but may be used with this plan; where required, it should be placed at the distances from the Datum shown in Plan DZB7, TSM Chapter 8 Part 1: Design 2009.
- Note 3:** Refer to section 1.4 Eligibility Criteria in this document.

B5 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a three nearside lane closure on a four lane dual carriageway road for which the national speed limit applies (adapted from Diagrams DZA3 and DZB7).



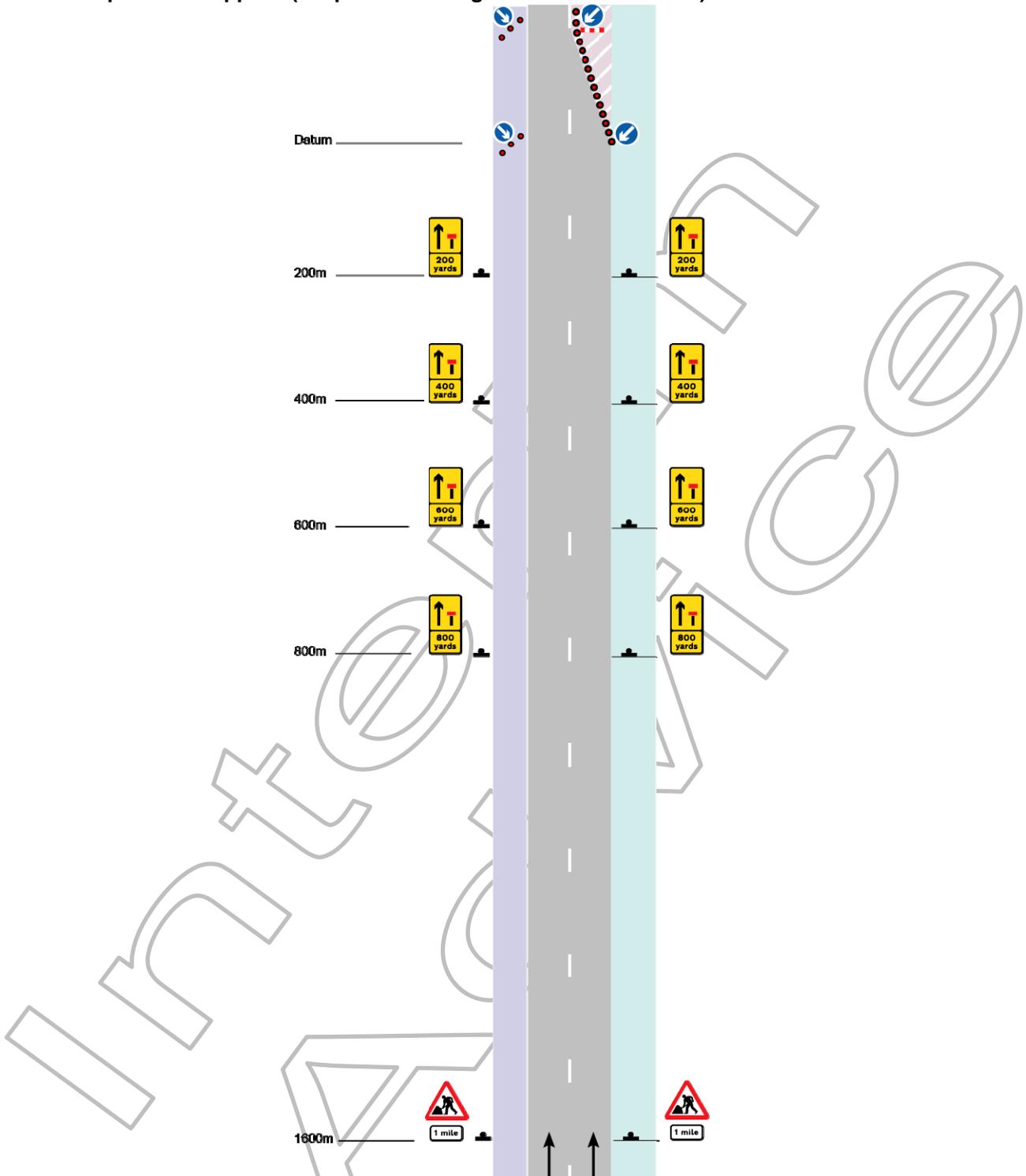
Note 1: The temporary mandatory speed limit signing has been omitted for clarity; where required, it should be placed at the distances from the datum shown in Plan DZB7, TSM Chapter 8 Part 1: Design 2009.

B6 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a three nearside lane closure on a four lane dual carriageway road for which the national speed limit applies, where the central reserve (offside) signs are omitted (adapted from Diagrams DZA3 and DZB7).



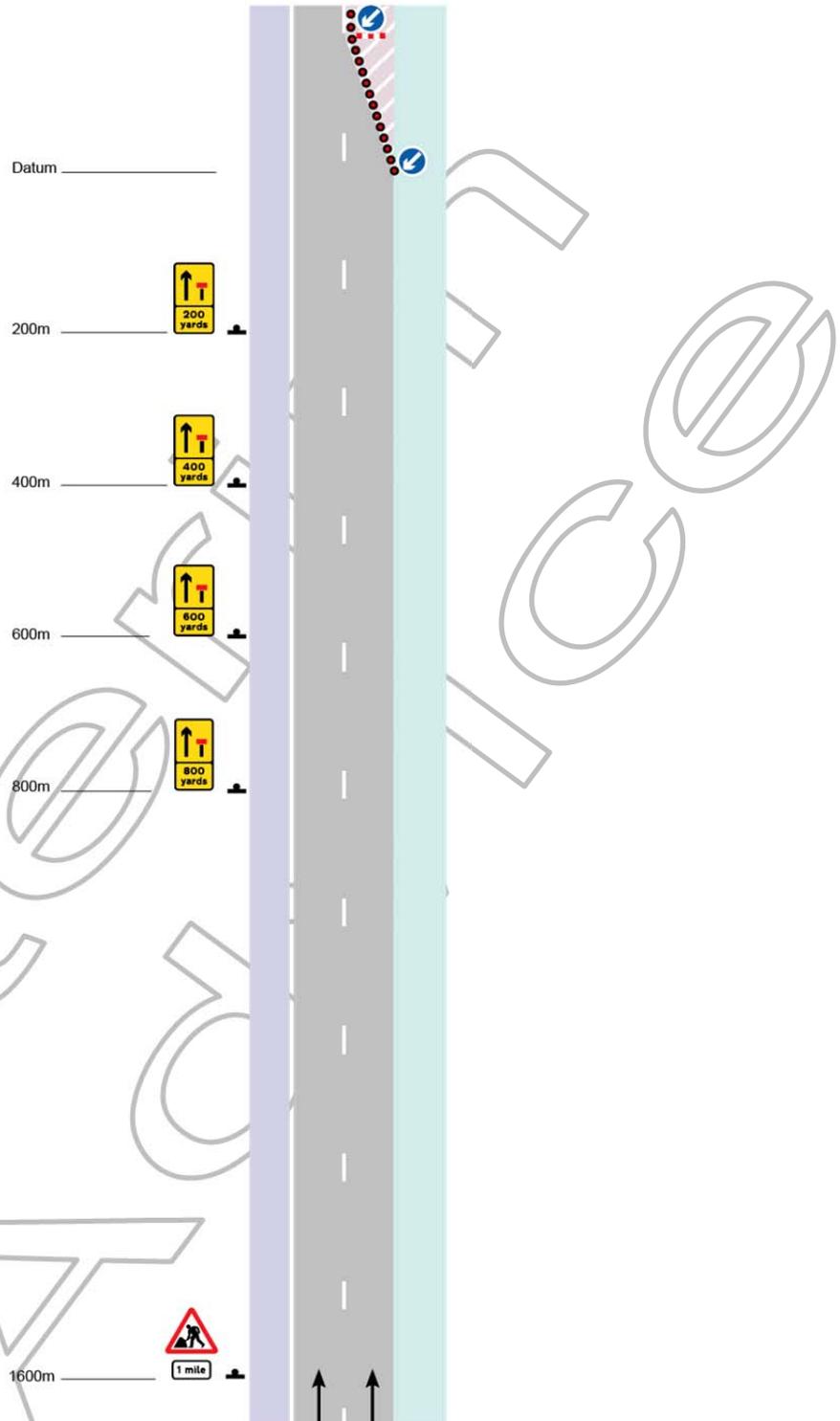
- Note 1:** This plan may only be used for a three nearside lane closure, for relaxation schemes on a dual carriageway with four lanes, where the national speed limit applies, including Smart Motorway All Lane Running routes.
- Note 2:** Temporary mandatory speed limit signing has been omitted, but may be used with this plan; where required, it should be placed at the distances from the Datum shown in Plan DZB7, TSM Chapter 8 Part 1: Design 2009.
- Note 3:** Refer to section 1.4 Eligibility Criteria in this document.

B7 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a single offside lane closure on a two lane motorway with hard shoulder for which the national speed limit applies (adapted from Diagrams DZA3 and DZB6).



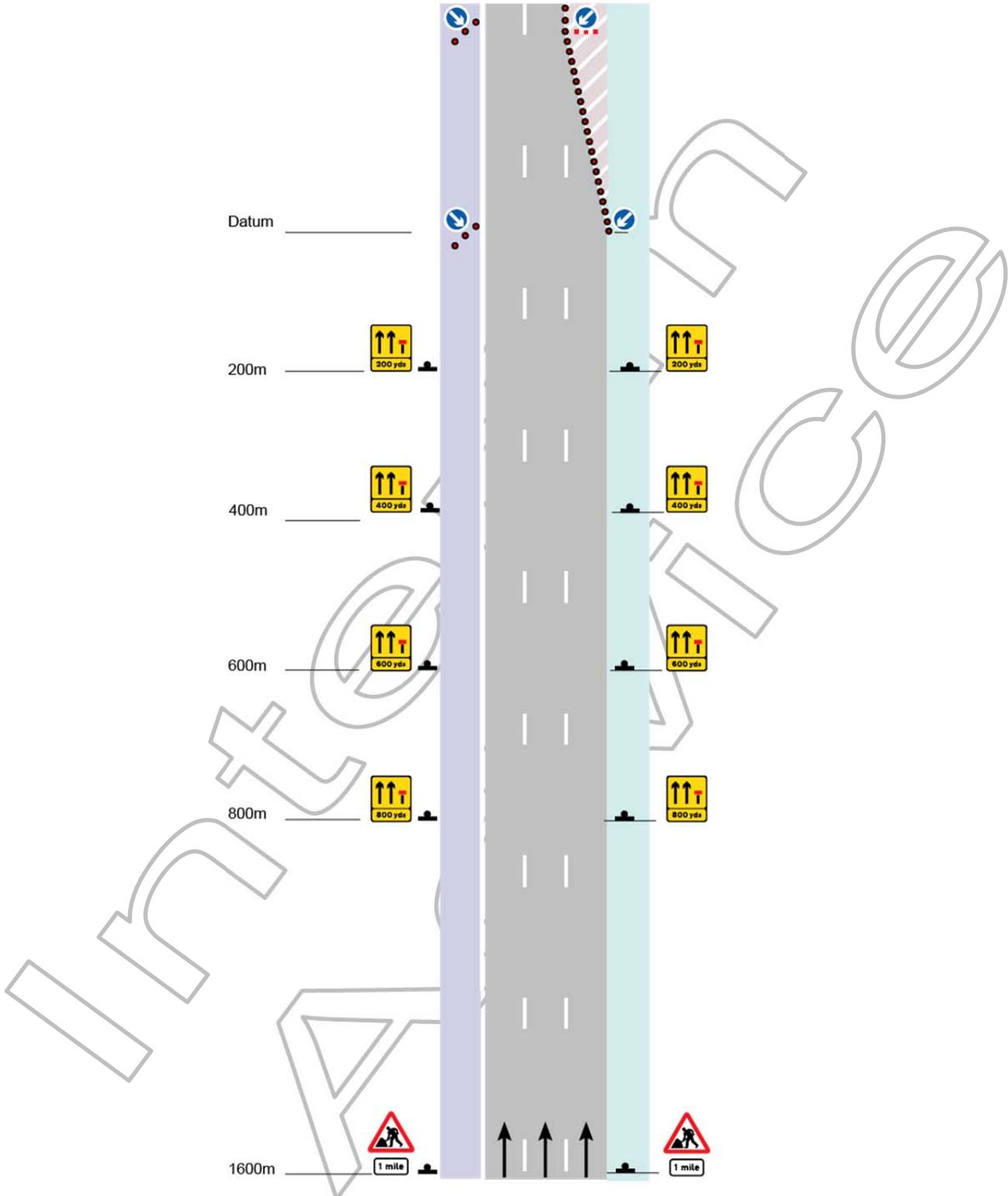
Note 1: The temporary mandatory speed limit signing has been omitted for clarity; where required, it should be placed at the distances from the datum shown in Plan DZB6, TSM Chapter 8 Part 1: Design 2009.

B8 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a single offside lane closure on a two lane motorway with hard shoulder for which the national speed limit applies, where the central reserve (offside) signs are omitted (adapted from Diagrams DZA3 and DZB6).



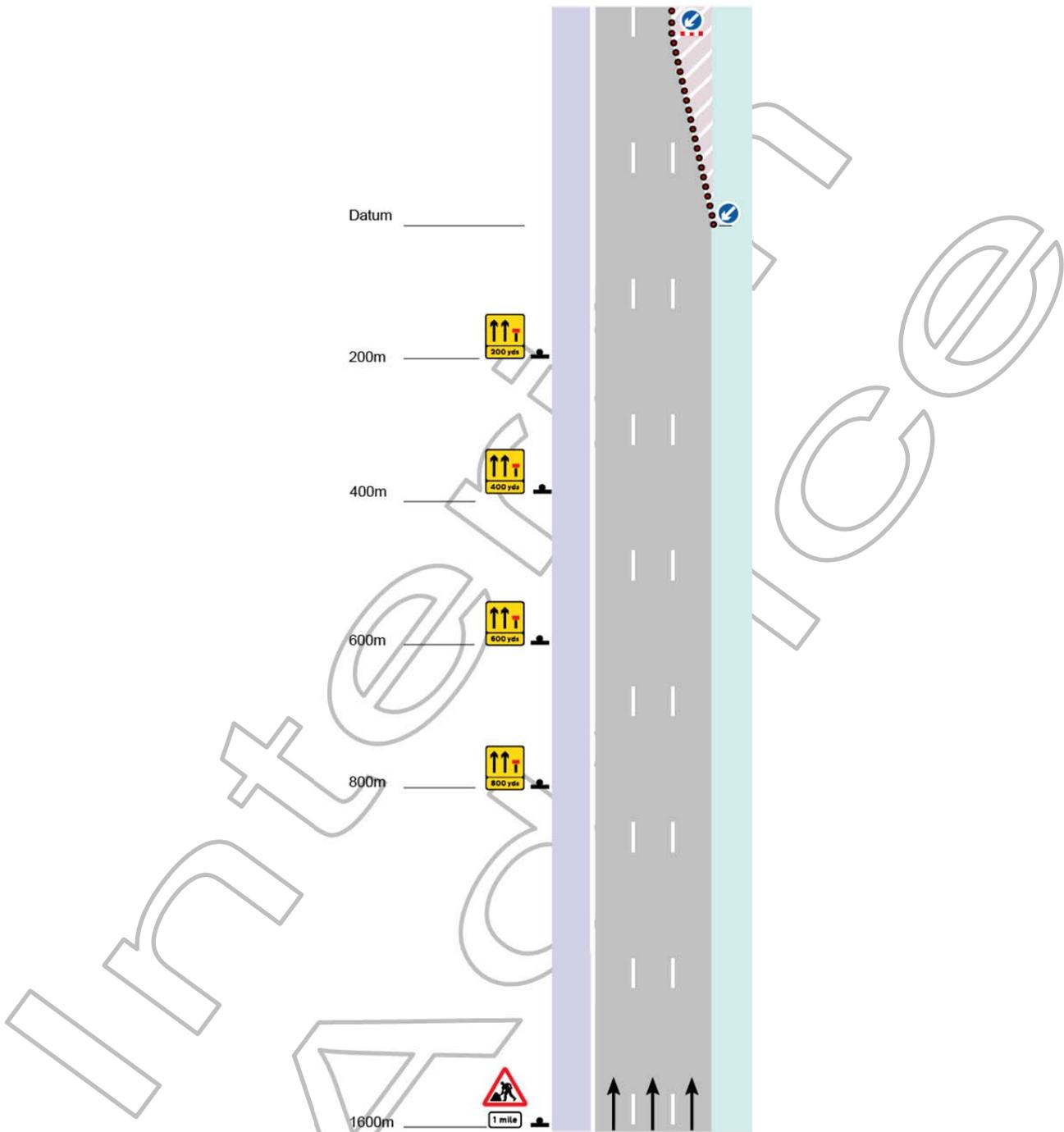
- Note 1:** This plan may only be used for a single offside lane closure for relaxation schemes on a two lane motorway with hard shoulder, where the national speed limit applies.
- Note 2:** Temporary mandatory speed limit signing has been omitted, but may be used with this plan; where required, it should be placed at the distances from the Datum shown in Plan DZB6, TSM Chapter 8 Part 1: Design 2009.
- Note 3:** Refer to section 1.4 Eligibility Criteria in this document.

B9 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a single offside lane closure on a dual carriageway road with three or four lanes for which the national speed limit applies (adapted from Diagrams DZA3 and DZB6).



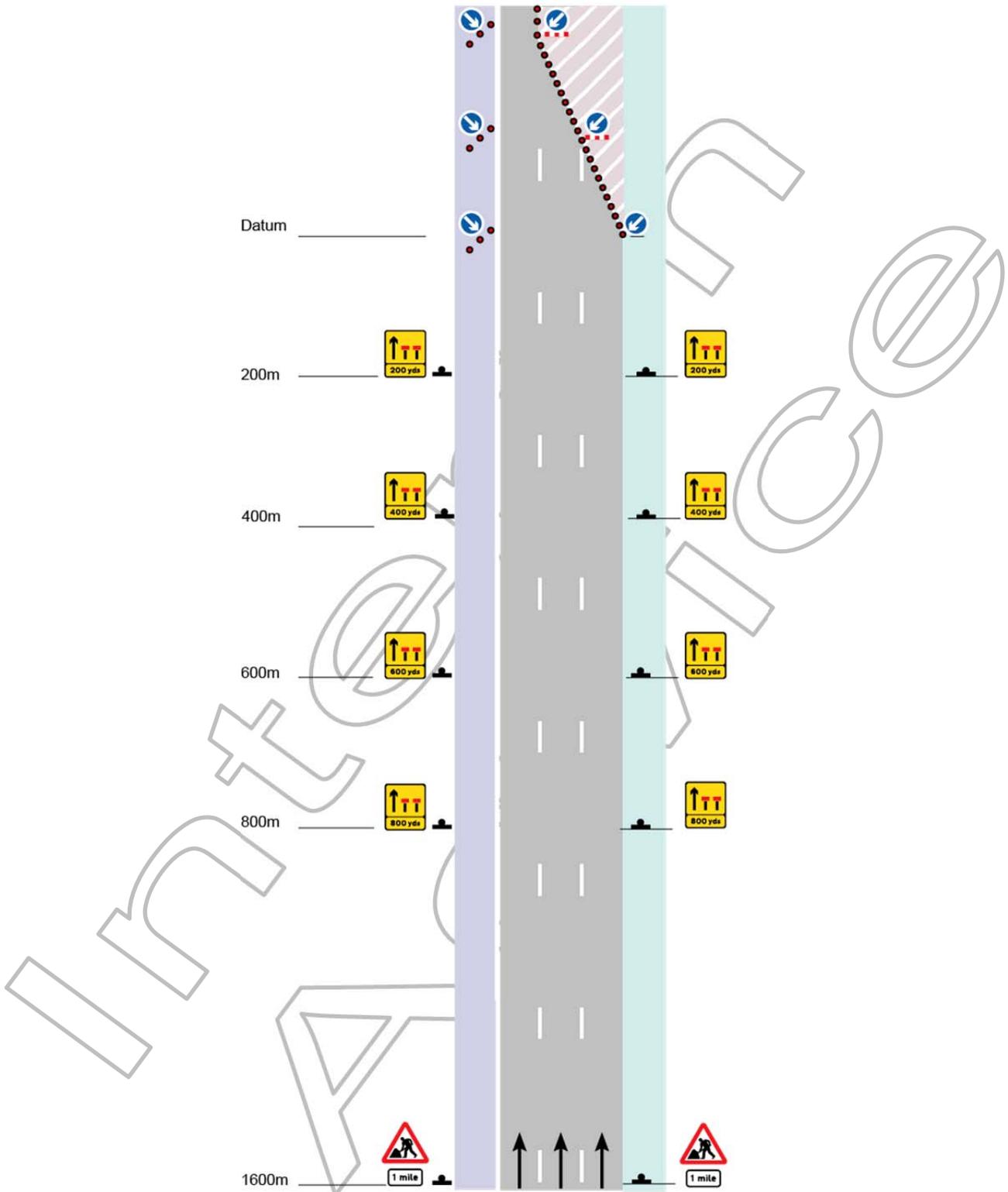
Note 1: The temporary mandatory speed limit signing has been omitted for clarity; where required, it should be placed at the distances from the datum shown in Plan DZB6, TSM Chapter 8 Part 1: Design 2009.

B10 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a single offside lane closure on a dual carriageway road with three or four lanes for which the national speed limit applies, where the central reserve (offside) signs are omitted (adapted from Diagrams DZA3 and DZB6).



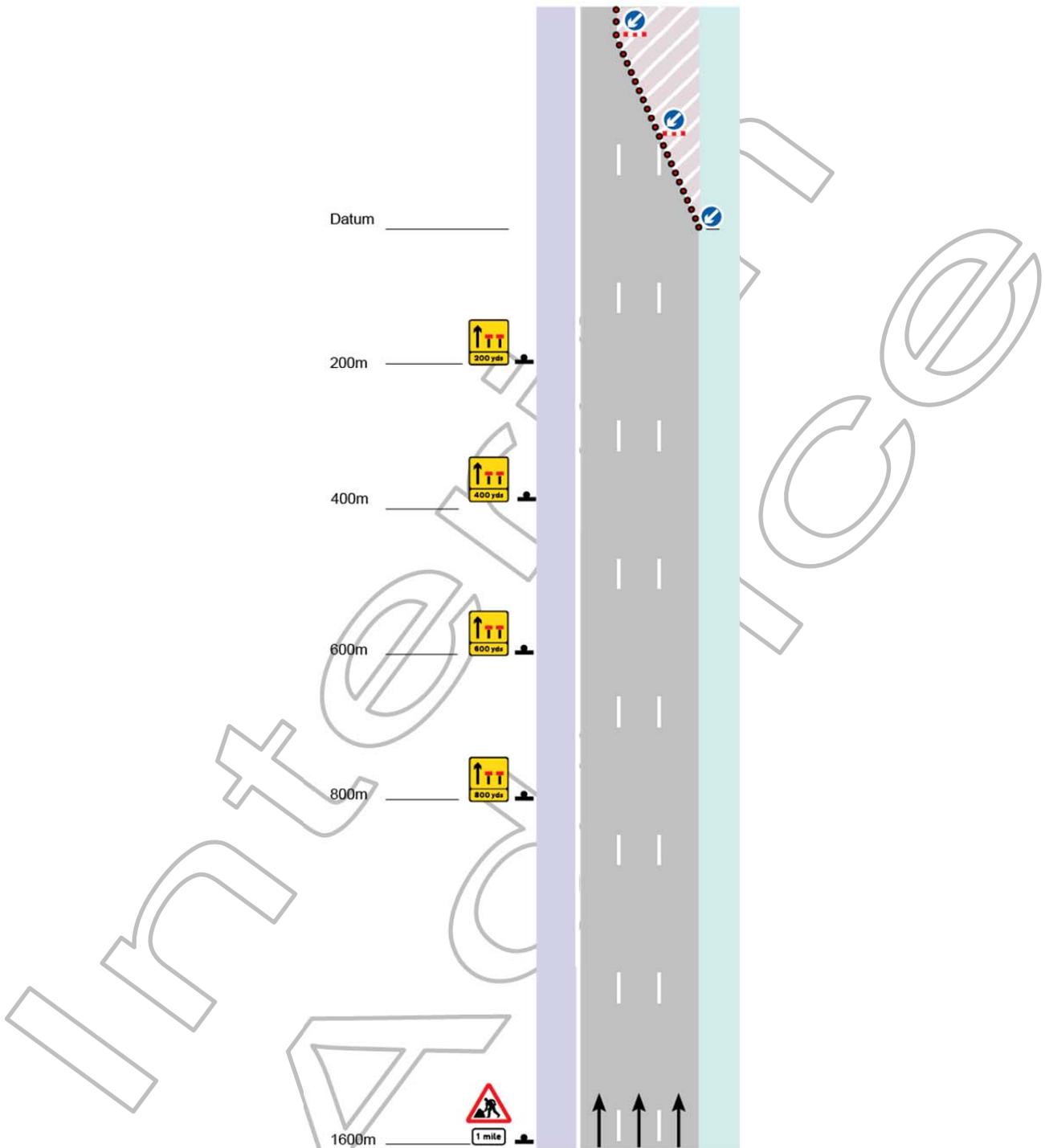
- Note 1:** This plan may only be used for a single nearside lane closure, for relaxation schemes on a dual carriageway with three or four lanes, where the national speed limit applies.
- Note 2:** Temporary mandatory speed limit signing has been omitted, but may be used with this plan; where required, it should be placed at the distances from the Datum shown in Plan DZB6, TSM Chapter 8 Part 1: Design 2009.
- Note 3:** Refer to section 1.4 Eligibility Criteria in this document.

B11 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a two offside lane closure on a dual carriageway road for which the national speed limit applies (adapted from Diagrams DZA3 and DZB7).



Note 1: The temporary mandatory speed limit signing has been omitted for clarity; where required, it should be placed at the distances from the datum shown in Plan DZB7, TSM Chapter 8 Part 1: Design 2009.

B12 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a two offside lane closure on a dual carriageway road for which the national speed limit applies, where the central reserve (offside) signs are omitted (adapted from Diagrams DZA3 and DZB7).

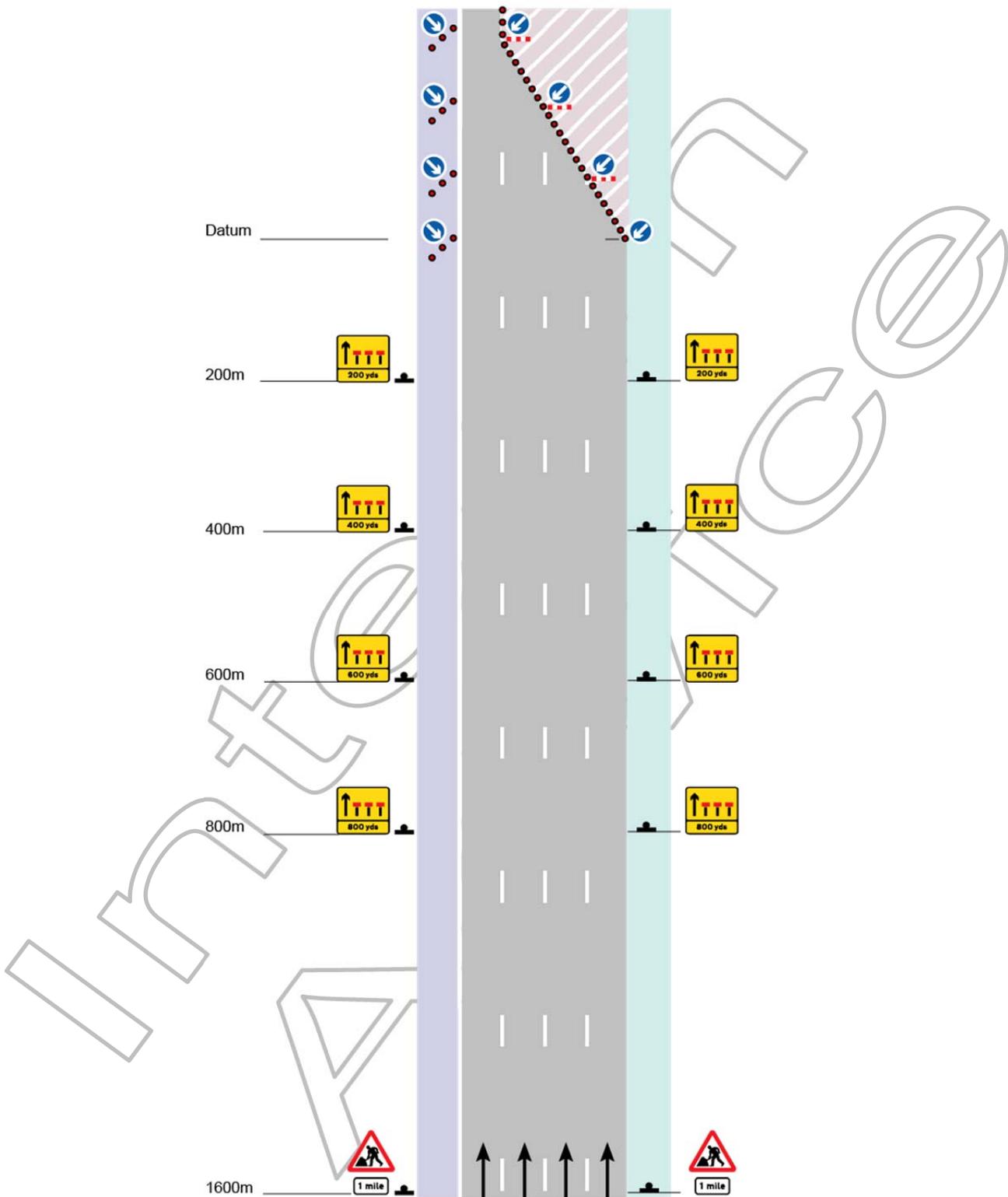


Note 1: This plan may only be used for a two offside lane closure, for relaxation schemes on a dual carriageway with three or four lanes, where the national speed limit applies.

Note 2: Temporary mandatory speed limit signing has been omitted, but may be used with this plan; where required, it should be placed at the distances from the Datum shown in Plan DZB7, TSM Chapter 8 Part 1: Design 2009.

Note 3: Refer to section 1.4 Eligibility Criteria in this document.

B13 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a three offside lane closure on a dual carriageway road for which the national speed limit applies (adapted from Diagrams DZA3 and DZB7).



Note 1: The temporary mandatory speed limit signing has been omitted for clarity; where required, it should be placed at the distances from the datum shown in Plan DZB7, TSM Chapter 8 Part 1: Design 2009.

Annex C: Background Information: Research and On-road Trials – Temporary Traffic Management Signs Simplification

A number of alternative TTM designs were considered in place of the current Chapter 8 schemes. In addition, a literature review was conducted to inform further decisions on alternative TTM layouts that may be appropriate to use, in order to reduce risks to road workers.

C1 TRL Report RPN 479 (2009): Driver Interaction with Temporary Traffic Management

This research suggested that in some of the current TTM layouts, there may be more temporary signs than are needed for a driver to understand how he/she is required to behave in order to pass through road works safely.

C2 TRL Report RPN 887 (Feb 2010): Simulation Trials

Computer simulation trials were used to test driver recognition of and responses to alternative TTM signing schemes.

Each TTM signing scheme reduced the number of signs on the approach to the road works, while still informing drivers about the changes to the road layout ahead and the required driver behaviour. The simulation trial showed that the drivers behaved in a safe and consistent manner in the different TTM signing configurations.

C3 TRL Report RPN 1813 (2011): Driver Interaction with Temporary Traffic Management – On Road Trials

The first part of the on-road trials commenced in Areas 4 and 10 in October 2010 to January 2011 to test removal of the 600 yard advance warning signs (to Diagrams 7202 & 7208 in the TSRGD 2002).

Omission of the 200 yard advance warning signs (to Diagrams 7202 & 7208 in the TSRGD 2002) was also trialled on-road.

This was conducted within the second part of the on road trials where removal of both the 600 yard and 200 yard advance warning signs, together with removal of “Detail A” signs (Table A.1.5 Chapter 8, 2002) was tested. The following report details the findings from this second phase:

Trials were conducted in two HA areas. Analysis of 120,000 vehicles travelling through alternative and control schemes showed no evidence to suggest there was any difference in lane movement of vehicles under the experimental conditions.

On the basis of this data, the research provided a strong indication that this alternative technique, involving a single nearside lane closure, or single offside lane closure, on three lane dual carriageways presents no additional safety risk to road users.

C4 Consultation: Road Worker Safety Forum (RoWSaF) Working Group and Technical Project Board

The HA has consulted key internal and external stakeholders on this change in guidance to service providers and has considered any feedback received. The consultation group consisted of RoWSaF members plus other key stakeholders consulted via a “Technical Project Board”.

C5 Conclusions – TTM Signs Simplification

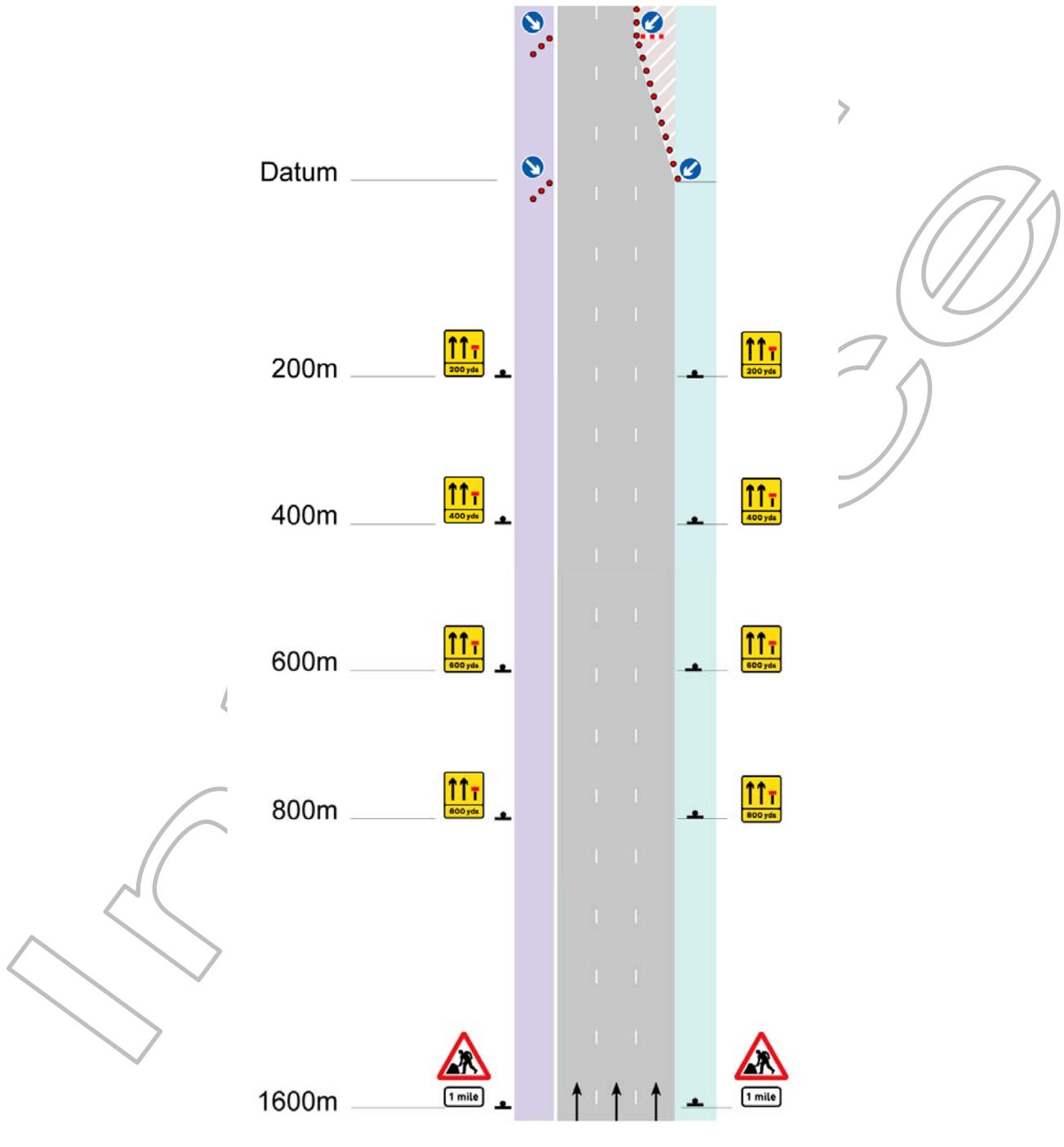
The results of this research indicated that drivers behaved in a safe and consistent manner where specified nearside and offside signs were omitted. There were no significant changes in any safety critical behaviour by road users on the approach to road works.

The HA has accepted this alternative TTM technique “TTM signs simplification” at relaxation scheme single nearside lane closures, or single offside lane closures, on a dual carriageway where the national speed limit applies, as an operationally valid alternative to the current Chapter 8 TTM scheme arrangements shown in Plans DZA3 and DZB6 of TSM Chapter 8 Part 1: Design 2009.

INTENTIONS

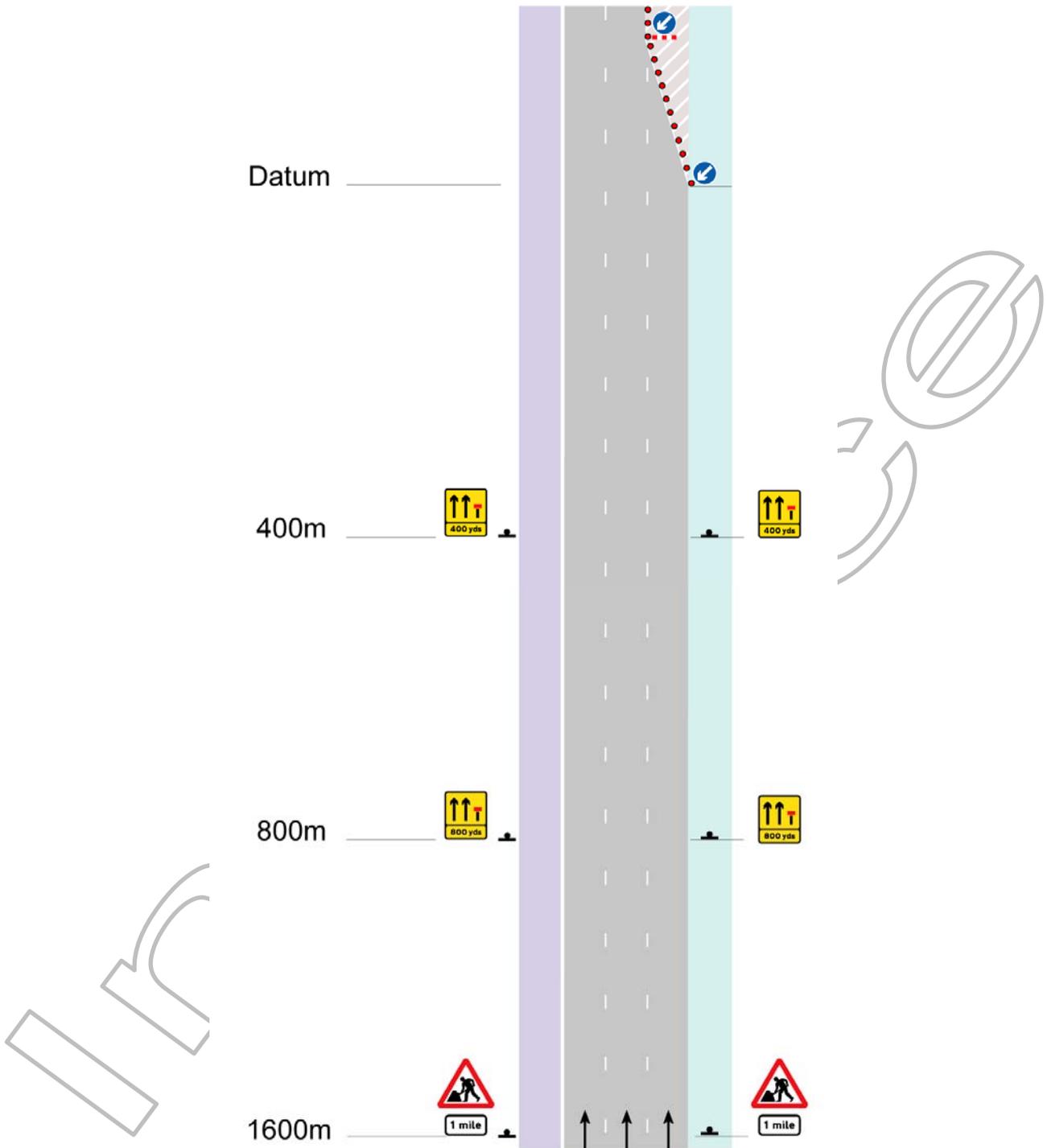
Annex D: TTM Plan Drawings – Temporary Traffic Management Signs Simplification, Single Offside Lane Closure

D1 TSM Chapter 8 relaxation scheme plan for approach and lane change zones, for a single offside lane closure on a dual carriageway road for which the national speed limit applies (adapted from Diagrams DZA3 and DZB6).



Note 1: The temporary mandatory speed limit signing has been omitted for clarity; where required, it should be placed at the distances from the datum shown in Plan DZB6, TSM Chapter 8 Part 1: Design 2009.

D2 TSM Chapter 8 relaxation scheme signing plan for approach and lane change zones, for a single offside lane closure on a dual carriageway road for which the national speed limit applies, with simplified TTM signing (adapted from Diagrams DZA3 and DZB6).



- Note 1:** This plan may only be used for a single lane closure on relaxation scheme TTM on a dual carriageway for which the national speed limit applies.
- Note 2:** Temporary mandatory speed limit signing has been omitted, but may be used with this plan; where required, it should be placed at the distances from the Datum shown in Plan DZB6, TSM Chapter 8 Part 1: Design 2009.
- Note 3:** Refer to section 1.4 Eligibility Criteria in this document.