

Interim Advice Note 28/00
TRUNK ROAD TRAFFIC CALMING, IAN 28/00

Summary: This document provides advice on the use of traffic calming measures on trunk roads, refers to sources for design details and shows procedures to be followed by Highways Agency's project managers in the preparation of traffic calming schemes. The document does not specify best practices.

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1 INTRODUCTION

1.1 GENERAL

Traffic calming is the use of specific traffic management measures (usually physical) in order to reduce and control vehicle speeds to a level commensurate with the activities taking place along that road, at the same time, encouraging appropriate driver behaviour in adopting a smooth speed without excessive acceleration or deceleration.

Traffic calming has largely been used in urban areas on roads with speed limits of 30mph or less. Measures are available for higher speed roads, however as speeds increase it becomes less safe to use physical measures and greater reliance is placed on non-physical means. Non-physical measures are likely to result in less significant reductions in speed unless they can be accompanied by strict enforcement of speed limits. The limited availability of police resources for the enforcement of traffic regulations generally means that schemes need to be self enforcing to achieve the required speed reductions.

Application of traffic calming measures at higher speed roads within the trunk road system, particularly where they pass through rural settlements, can still have a role to play. However, conflicts can arise between achieving appropriate speed reductions and reducing the impact of the measures on the surrounding landscape. It has been found for example that most effective traffic calming measures are those which are very conspicuous. Unfortunately, such measures may not blend with the surrounding landscape and conflicts of aesthetics can arise. Obviously compromises must be made, but in taking such steps the designer must be aware that modifications in the design of traffic calming measures may result in less speed reduction being obtained. This must be fully taken into account when estimating speed reductions, otherwise the public can be misinformed as to the likely effect of a particular scheme.

Higher proportion of heavy vehicles will have a significant effect on the designs to be employed when designing traffic calming schemes for trunk roads. Proposals must take into account the influence they can have on traffic and vehicle noise, vibrations and the turning areas required for larger vehicles.

This document draws on experience gained from previous trunk road traffic calming schemes in the United Kingdom and abroad. It is an Interim Advice Note to assist Project Managers considering traffic calming projects. It is envisaged that it will be updated in due course.

1.2 SCOPE

This Advice Note has been prepared for internal use within the Highways Agency and is applicable for use on trunk roads only. It explains the procedure to be followed by Project Managers when implementing a traffic calming scheme and presents sources and references for more detailed information.

1.3 TRAFFIC CALMING OBJECTIVES

The Advice Note highlights the potential benefits of traffic calming in relation to the following Government objectives for transport:

- improving safety
- protecting the environment
- integrating transport
- improving accessibility
- assisting economic growth

More specifically, traffic calming schemes may be used on trunk roads to achieve the following objectives:

1. Encourage appropriate vehicle speeds.
2. Enhance safety along a particular route.
3. Deter vehicles from using inappropriate off trunk road routes.
4. Reduce community severance.
5. Facilitate access for public transport, pedestrians and cyclists.
6. Environmental enhancement.
7. Improve driver awareness and promote appropriate behaviour.

It is probable that traffic calming will be used as part of wider traffic control or traffic management proposals. Although some traffic management techniques may not be termed traffic calming, they can assist in achieving the above objectives.

2 TRAFFIC CALMING TECHNIQUES

2.1 GENERAL

There is a range of traffic calming techniques which fall into the broad categories of: **Physical measures**, horizontal and vertical deflections (a driver is encouraged to reduce speed by a sharp change in the vertical and/or horizontal alignment which causes discomfort when travelling at higher speeds); and **Non-physical measures** (using coloured/textured surfacing, variable signs, speed limits, gateways, etc.).

Most traffic calming schemes will consist of a combination of physical and non-physical measures. In any particular scheme, the techniques to be used for achieving the objectives should be selected based on the most appropriate and effective measures. Examples of a number of measures and their combinations are given in DETR Traffic Advisory Leaflets, see TAL 4/99 - Traffic Calming Bibliography.

It is probable that most traffic calming schemes on trunk roads will be at locations where trunk roads pass through small towns and villages and where no alternative route is available. The measures to be adopted should aim to remind the driver that he is sharing the road with other users and therefore should drive with consideration. In these cases traffic calming schemes can have:

- a. Measures **to warn** drivers that there is a change in character of the road and a speed restriction ahead, e.g. countdown markers in a sub-standard visibility situation.
- b. Measures **at the entrance** of a settlement where drivers are expected to have adopted a different style of driving, e.g. Gateways.
- c. Measures **within a settlement**, drivers are expected to continue to drive with consideration for the local people, e.g. 'slow' or speed limit roundel markings.

The techniques to be adopted should be appropriate for the objectives of the particular scheme. To reduce and control speeds on the approaches to and through the village, it will generally be necessary to employ a combination of all the measures referred to above. Individual measures may not reduce speeds.

2.2 PHYSICAL MEASURES

Physical measures that can be used to achieve traffic calming objectives include:

- Horizontal deflections, including chicanes and narrowings.
- Mini-roundabouts.
- Traffic islands and pedestrian refuges.
- Rumble strips.
- Road humps, these may be in the form of flat or round top humps (used in rare circumstances on trunk roads) but can be very effective in reducing speeds where the speed limit is 30 mph or less. Their use is not allowed on roads with speed limits greater than 30mph.
- Speed cushions that allow heavy vehicles and emergency vehicles to straddle them.
- Thermoplastic road humps, and "Thumps"

For details and advice on the use of the above and other measures reference should be made to the current DETR TAL - Traffic Calming Bibliography which lists details of the leaflets currently available concerning traffic calming measures. Further information is also available in the sources listed in Annex A.

2.3 NON-PHYSICAL MEASURES

Non-physical methods and techniques that can be used to achieve traffic calming objectives include:

- Warning signs.
- Hatched markings (ladder markings) at verge and/or centre line.
- Count down signs and/or markings (these require special authorisation).
- Visual narrowing.
- Ghost islands and hatched vehicle exclusion areas.
- Speed limit signs and roundels.
- Other signing and road markings.
- Lower speed limits (must be accompanied by other measures). It should be noted that 20 mph speed limits are unlikely to be applied to trunk roads.
- Traffic Regulation Orders (TROs).
- Speed cameras.
- Vehicle activated signs.
- Provision of cycle lanes and cycleways.
- Changed priorities (including priorities for vulnerable road users).
- Part-time / VMS signs.

Many traffic calming techniques serve the function of alerting drivers to a change in road character and usage. In turn this type of measures can result in the environmental enhancement of an area. Examples of this include:

- Gateways and entry treatment, a feature or set of features highlighting the entrance to a village, town or bounded area. As well as highlighting the need to reduce speed, gateways can also be used to announce arrival at a town or village, state civic pride and impart a sense of place.
- Selected planting in conjunction with physical measures to provide horizontal deflections in the road layout. The designer should ensure that any planting does not interfere with sight lines.
- Coloured surfaces can be used to delineate a change in the character or use of the road thereby alerting drivers to new circumstances. Coloured surfaces can also be helpful in emphasising changes in speed limits, dedicated areas for vulnerable road users, etc.

2.4 OTHER TECHNIQUES

Other techniques that have been used successfully to reduce speeds or accidents include:

- Trials of chevron markings on the M1, designed to discourage close following, resulted in a two-thirds reduction in accidents locally.
- The effect of using yellow bar markings on approaches to roundabouts has been used to reduce accidents by about a sixth. This is an alerting and not a speed reducing device. Traffic calming regulations can be used for their implementation.
- Variable Message Speed Signs have been used on the M25 to improve flow patterns by imposing lower speeds at high flows.
- Improved Road lighting.

3 DESIGN PROCEDURE

3.1 SCHEME DEVELOPMENT

An appropriate level of engineering, safety, traffic and environmental assessment should be carried out for all traffic calming schemes to identify constraints and opportunities and inform decisions. A suggested procedure for the implementation of traffic calming schemes is given in Figure 1.

Traffic calming objectives are best achieved by a multi-disciplinary approach. Consultation with road safety officers, landscape architects, planners and other professionals can assist in maximising the benefits to be derived from a scheme. The range of expertise required will depend on the location, size and sensitivity of the project.

Consultation with the affected communities is essential throughout the investigation and design processes. Without this, local concerns and perceptions will be lost, and acceptance of the Agency's proposals will be difficult to achieve.

To assist Project Managers, a checklist (Annex B1) has been developed identifying the key stages in the development and implementation of traffic calming schemes.

The degree to which the procedure and checklist will be appropriate depends on the scale and complexity of the project. Not all schemes will require all the steps in the procedure.

3.2 ASSESSMENT , CONSULTATION AND ECONOMIC APPRAISAL

Assessment, consultation and design must be an iterative process and should consider the appropriateness and significance of topics. The design should take account of traffic calming Circulars, Guidance Notes, DETR leaflets and publications listed in (Annex A).

Particular emphasis should be attached to the Transport Objectives listed in sub-section 1.3 and to measures that benefit local communities, whether by improving safety and accessibility, assisting public transport, pedestrian and cycling provision or enhancing the environment. It should be noted that the success of traffic calming schemes is often linked to the associated environmental enhancement of the area.

In addition to an appropriate level of environmental assessment, the requirements for Project Appraisal Report (PAR), and EC Directive 85/337 as amended by EC Directive 97/11 and on larger projects Value Engineering should be met. The design process should also include provision for Safety Audits as appropriate.

During the currency of this Advice Note, and throughout the design process, advice may be obtained from the Traffic Safety and Environmental Division (TSE). The scheme programme should allow sufficient time to give TSE the opportunity to comment on the proposal and for Traffic Systems and Signing (TSS) to consider any signs authorisation application where applicable (see sub-sec.4.2)

3.3 DESIGN CONSIDERATIONS

The achievement of design objectives will require consideration of a wide variety of measures, bearing in mind that traffic calming applies to urban and rural situations. Solutions will vary from simple signing and markings to larger projects in sensitive locations that require more comprehensive solutions.

Individual schemes should be considered in relation to the overall route on which they are located. Although all schemes ought to be designed to provide site specific solutions designers should consider issues of route consistency. There may be merit in presenting a driver with the same message at each similar point on the road (e.g., identical gateways at every settlement).

Many of the design requirements for traffic calming features are enshrined in the applicable legislation or are detailed as advice in Traffic Advisory Leaflets issued by DETR. Other organisations such as CSS and the Institution of Highways and Transportation have also published advice and TRL have published reports on a variety of issues stemming from research into traffic calming sponsored by DETR. (See Annex A.)

3.3.1 Environmental Considerations

The degree to which environmental considerations should be applied will vary depending on the scale and complexity of the project. The methodology for environmental assessment is set out in Volume 11 of the Design Manual for Roads and Bridges. The potential for partnership with others, the character of the area and any distinctive features, the quality and range of paving materials and street furniture; improvements to existing lighting, noise and air quality implications, planting including offsite planting, and maintenance implications should all be considered.

3.3.2 Signing, Markings and Lighting

Generally traffic signs should be used to support traffic calming features. The purpose of signing, markings and lighting is to meet the requirements of the regulations and to provide advice to ensure that appropriate warning of traffic calming features is given to approaching vehicles at all times. It is recognised that road clutter can be a problem, therefore rationalisation of signs on the one hand, and the use of sympathetic lighting systems, such as white high pressure sodium lamps and cut off lanterns on the other are recommended. Signing and carriageway markings must comply with the Traffic Signs Regulations and General Directions. Authorisation needs to be applied for signing and markings that are not prescribed (see sub-section 4.2).

3.3.3 Pedestrians and Cyclists

The effects of traffic calming on cycling should be considered and where appropriate the design should be modified to accommodate cyclists. (See "Cycles in London" Manual and Traffic Advisory Leaflet 7/96). Local authority Cycling Officers should also be contacted to ascertain local requirements and preferred techniques.

Traffic calming schemes should be examined from a walking perspective, to identify potential obstacles, particularly for the young and elderly. Consideration of the needs of the disabled should also be included in the design process.

3.3.4 Bus Services

There may be a conflict between the application of traffic calming and the desirability to enhance and improve bus journeys as part of a drive towards sustainable transport. A balanced approach should be adopted which minimises the impact on bus services whilst achieving the overall objectives of the scheme. Contraflow bus lanes, bus pull-ins and loading platforms may be considered. Due to the difficulties that may arise with road humps, alternatives to kerb to kerb road humps may need to be considered in order to limit delay to buses and discomfort to bus passengers. However, where a hump is to be placed at a controlled crossing it must be a kerb to kerb flat top hump.

3.3.5 Emergency Services

It is important to identify key routes through traffic calmed areas where special provision for emergency services should be provided. Emergency services often have concerns about the effect of traffic calming schemes on response times, especially road humps. DETR Traffic Advice Leaflet 3/94 presents advice on common practice.

3.3.6 Parking and Servicing

Parking and servicing requirements should be integrated in the overall design. Opportunities may be available to rationalise parking for residents, shoppers, visitors and service vehicles.

3.3.7 Enforcement, TROs and Speed Limits

TROs and lower speed limits should not be imposed without the support of the police.

3.3.8 Maintenance

The implications for maintenance and whole life costs should be considered in the preparation of traffic calming schemes.

3.4 PUBLIC CONSULTATION

The extent of consultation with other bodies is a matter of judgement for Project Managers, bearing in mind that traffic calming schemes will, in most cases, materially affect the community, including arrangements for pedestrians, traffic and parking. The following groups should be consulted where appropriate:

- Police
- Emergency services - fire, ambulance
- Local Authority Ward Members/ Councillors and Local authorities - designated areas, refuse disposal, schools, sheltered accommodation, planning and local roads
- Parish Councils
- Statutory undertakers
- Bus operators
- Civic societies, local groups
- Residents, especially frontages
- Special interest groups - elderly, cyclists, disabled, schools
- Statutory Bodies
- Haulage or motoring associations
- Local farmers
- Members of Parliament
- Local Businesses/Industry
- Post Offices/Shops

Some traffic calming measures require statutory consultation prior to their implementation. In the case of road humps, the police, fire and ambulance services, and organisations representing persons using the highway, must be consulted. Traffic calming works falling under the traffic calming regulations require the police, and other persons using the highway to be consulted (as and when the highway authority thinks fit). It is advised that other emergency services and bus operators should be consulted on all proposed schemes.

An important part of consultation is related to the process of seeking the views of those members of the public likely to be affected by the traffic calming. Traffic calming is provided for the benefit of local communities, to address their concerns, enhance their safety and improve their quality of life. Therefore consultation should be carried out as widely as possible. Reasons for the scheme must be explained before implementation and an opportunity must be given for people to comment on the schemes; it needs to be demonstrated that due consideration has been given to the points raised.

The use of publicity such as leaflets (including photomontage), questionnaires and public meetings should be considered essential. Project Managers should note that experience to date has shown that residents are unlikely to be satisfied with schemes that do not achieve their expectations. As a result it is important not to raise their hopes unrealistically. Wide consultation and public participation is therefore essential at the scheme development stage.

3.5 MONITORING

Following implementation of a traffic calming scheme, specially in a trial of innovative measures, it is important that the effectiveness of these measures are realistically assessed. In order to monitor the performance properly, data collection for accidents, speed, noise, air pollution, public perception surveys and consultations should be carried out 'after' as well as 'before' the implementation of the

traffic calming scheme. The results should be recorded for future reference. (see para4.2.2, and the PAR Guidance on Evaluation).

4 LEGISLATION, AUTHORISATION AND REVIEW

4.1 LEGISLATION

Traffic Calming Regulations are available for a wide range of traffic calming measures used on public roads.

4.1.1 Highways Act 1980

The Highways Act (with amendments) is the primary legislation upon which secondary legislation covering traffic calming has been built. It provides the enabling powers for highway authorities to install traffic calming measures including road humps on public roads.

- Section 64 – roundabouts,
- Section 68 - pedestrian refuges,
- Section 75 - variations in the relative width of carriageways and footways,
- Section 77 - alterations in the level of the highway,
- Sections 90A-F - powers to install road humps,
- Sections 90G-I - provides powers to install traffic calming works, which are defined in the Highways (Traffic Calming) Regulations 1999.

4.1.2 Traffic Calming Act 1992

The Traffic Calming Act 1992 amended the Highways Act 1980 by the addition of Section 90G, 90H and 90I which allow works to be carried out for the purposes of promoting safety and preserving or improving the environment. This added to powers already in the Highways Act 1980 that could be used for traffic calming purposes.

4.1.3 The Traffic Signs Regulations and General Directions 1994

The Secretary of State for Transport makes Regulations and gives Directions regarding traffic signs and road markings within this Instrument. TSRGD 1994 came into force on 12 August 1994, revised regulations is under consideration.

4.1.4 The Highways (Traffic Calming) Regulations 1999

These regulations provide powers for highway authorities to install build-outs, chicanes, pinch-points, gateways, islands and overrun areas and rumble devices.

4.1.5 The Highways (Road Humps) Regulations 1999

The Highways (Road Humps) Regulations 1999 enable highway authorities to adopt a very flexible approach to the design of road humps. However, highway authorities must exercise a duty of care and should ensure that innovative designs do not compromise safety.

It should be noted that road humps, without special authorisation, cannot be installed on roads with speed limits greater than 30 mph. To date no road hump design has been found suitable for use on roads with speed limits greater than 30 mph.

4.2 SPECIAL AUTHORISATION AND REVIEW (TRUNK ROADS ONLY)

4.2.1 Traffic Signs and Road Markings Authorisation (Trunk Roads Only)

The purposes for which signs are prescribed in the Traffic Signs Regulations and General Directions cannot be changed by special authorisation. If however, innovative features are introduced for which there is no prescribed warning or information sign, applications can be considered for special authorisation. The applications should contain:

1. A description of the scheme and any supporting papers from the emergency services, etc. about the proposals.
2. A full explanation of why a prescribed sign is not suitable.
3. Five copies of each site plan showing the location of the proposed signs and any associated signing that affects the proposals.
4. Five copies of each sign drawing including details of colours and sizes.
5. Completed pro-forma for authorisation of non-prescribed traffic signs on trunk roads.
6. For a traffic-calming scheme TSE- Review Form (Annex B2)

Proposals should initially be discussed informally and agreed in principle before a formal submission is made. Any authorisations of novel signing are likely to be for a limited time period and a report on their effectiveness will be required before further authorisation is considered. Application for special authorisation of traffic signs and markings for use on trunk roads should be sent to:

Highways Agency - Quality Services, Traffic Systems and Signing (SMRT)
Southwark Street, London SE1 OTE

4.2.2 Traffic Calming Measures Review (Trunk Roads Only)

During the currency of this Guidance Note, advice may be sought at an early stage of traffic calming scheme's design process from the Traffic Safety and Environment Division. Advice can also be given on the use of traffic calming features not covered by the traffic calming regulations, or whether existing powers would allow their installation. For a considered performance advice and environmental assessment and to facilitate the process for signs and marking authorisation in traffic-calming schemes, the information required should contain:

1. Checklist & Review Form (Annex B1&2)
2. Brief description of the measures, their purpose, justification of the proposed features, estimated casualty savings (if appropriate) and police and emergency services comments (if any)
3. Two copies of the scheme's location map
4. Two copies of the working drawings showing the measures proposed.

Details for trunk roads traffic calming proposals, should be sent to:

Highways Agency - Quality Services, Traffic Safety and Environment (SLVR)
Southwark Street, London SE1 OTE.

To enable the preparation of a database of measures implemented on parts of the network and an understanding of their effectiveness, advance notification of current proposals including scheme brief and program details should be forwarded at the earliest possible date. This should be followed by as-built drawings and before and after performance reports. This can be part of the Project Appraisal Report (PAR) where traffic calming has been identified in the report.

Scheme Development

- Identify the problem.
- Prepare scheme brief.
- Carry out data collection and "Before" surveys.
- Determine feasibility of traffic-calming measures, consultations and assessment of benefits.
- Develop scheme options.
- Consider requirements for value engineering and project appraisal report.

Option Appraisal

- Appraise and evaluate scheme options.
- Public consultation as necessary.
- Determine preferred option.
- Consider requirement for safety audits
- Apply for authorisation for measures not covered by TSRGD, Highways and other traffic calming legislation.

Design Consideration

- Detail design and consultations.
- Consider requirement for safety audits
- Implementation.

Monitoring

- Monitor traffic calming site, 'after' surveys and assessment.
- Consultations and reporting of results.

Figure 1 – Scheme Development and Design Procedure

ANNEX A - SOURCES

A1 - PRIMARY SOURCES

Legislation

Highways Act 1980.
Traffic Calming Act 1992.
Highways (Road Humps) Regulations 1999
Highways(Traffic Calming)Regulations 1999.
Traffic Signs Regulations and General Directions 1994.

Policy

1997 White Paper
PPG 13

DETR - Circular Roads

3/90 Road Humps.
2/92 Road Humps and Variable Speed Limits.
1/93 Road Traffic Regulation Act 1984: Sections 81- 85 Local Speed limits.
2/93 The Highways (Traffic Calming) Regulations 1993.
5/99 20 mph Speed Limit

DETR -Traffic Advisory Leaflets

3/93 Traffic Calming - Special Authorisations.
7/93 Traffic Calming Regulations.
11/93 Rumble Devices.
12/93 Overrun Areas.
13/93 Gateways.
2/94 Entry Treatments.
3/94 Emergency Services & Traffic Calming: A Code of Practice.
4/94 Speed Cushions.
7/94 "Thumps" - Thermoplastic Road Humps.
9/94 Horizontal Deflections.
1/95 Speed Limit Signs - A Guide to Good Practice.
2/95 Raised Rib Markings.
4/95 Pedestrian Crossing - Assessment and Design.
7/95 Traffic Islands for Speed Control.
1/96 Traffic Management in Historic Areas.
2/96 75mm High Road Humps.
6/96 Traffic Calming: Traffic and Vehicle Noise.
7/96 Highways (Road Humps) Regulations 1996.
1/97 Cyclists at Road Narrowing.
12/97 Chicane Schemes.

9/98 Sinusoidal, 'H' and 'S' Road Humps.
3/90 *Urban Safety Management - IHT Guidelines.*
7/91 *20 MPH Speed Limit Zone.*
2/92 *The Carfax, Horsham - 20 MPH Zone.*
1/94 *VISP - A Summary.*
8/94 *Traffic Signs, Signals and Road Markings Bibliography.*
2/97 *Traffic Calming on Major Roads: A49, Craven Arms, Shropshire.*
6/97 *Traffic Calming on Major roads: A47, Thorny, Cam.*
1/98 *Speed Cushion Schemes.*
4/99 *Traffic Calming Bibliography.*
9/99 20 mph Speed Limits and Zones

Other Standards/ Guidance Notes

Coloured Surfacing in Road Layout (Excluding Traffic Calming)
DMRB TA 81/99.
"Traffic Calming on Through Routes" (Scottish Office, 1997).
Disability Unit Circular 1/91 "The Use of Dropped Kerbs and Tactile Surfaces at Pedestrian Crossing Points" (Department of Transport).
"Guidance on the Use of Tactile Paving Surfaces" (DETR Mobility Unit).

Appraisal

DETR Report 'A New Deal for Trunk Roads in England'.
Guidance on the New Approach to Appraisal
Project Appraisal Report and Guidance Note.

A2 - FURTHER READING

Transport Research Laboratory (Transport Research Foundation)

Project Report 18, "Road Humps for Controlling Vehicle Speed"
Project Report 32, "Speed Control Humps - A Trial at TRL"
Project Report 33, "An assessment of rumble strips and rumble areas"
Project Report 35, "The effectiveness of village "gateways" in Devon and Gloucestershire".
Paper Pa2046191 Translation of Dutch 30KPH zone Design Manual.
Project Report 43, "On Road, Trials of Speed Cushions in Sheffield and York"
Project Report 85, "Speed Reduction in 24 Villages: Details from the VISP Study"
Annex to Project Report 85, Speed Reduction in 24 Villages: Colour Photos from the VISP Study
Project Report 101, "Speeds at "Thumps" and Low Height Road Humps"
Project Report 102, "Horizontal Deflection (Chicane) Trials at TRL"
Project Report 103, "Vehicle and Traffic Noise Surveys alongside Speed Control Cushions-York"
Project Report 174, "The Environmental Assessment of Traffic Management Schemes: A Literature Review"
Project Report 177, "Traffic Calming - Vehicle Activated Speed Limit Reminder Signs".
TRL 212 "Traffic Calming on Major Roads: The A49 Trunk Road at Craven Arms, Shrops.
TRL 238 "Traffic Calming on Major Roads: The A47"
TRL 288 "Traffic Calming in Historic Core Zones: Crosseley Street, Halifax"

TRL 245 "Using the Driver simulator to Evaluate Traffic Calming Measures"
TRL 311 "Traffic Calming - Public Attitudes: A Literature Review."
TRL 307 "Traffic Calming and Vehicle Emissions: A Literature Review"
TRL 313 "Traffic Calming - An Assessment of Selected On-road Chicane Schemes"
TRL 377 "Sinusoidal, 'H' and 'S' Humps"

Others

Urban Safety Management Guidelines -IHT

Rural Safety Management Guidelines -IHT

"Village Speed Control Working Group - Final Report" (CSS, DETR, The Scottish Office, The Welsh Office, TRL).

"The Effect of Traffic Calming Measures on Vehicle and Traffic Noise", by Phil Abbott, Marie Taylor and Roger Layfield (Traffic Engineering and Control, September 1997).

"A review of the 20 mph speed zones: 1991", by A R Hodge (TRL Traffic Engineering and Control, October 1992).

"The Grounding of Vehicles on Road Humps", by David C Webster (TRL Traffic Engineering and Control, July/August 1993).

"Traffic Calming in Practice" (County Surveyors' Society, Department of Transport, Association of Metropolitan District Engineers, Association of London Borough Engineers and Surveyors, Association of Chief Technical Officers).

"Traffic Calming Measures: Fibre Optic Speed Activated Sign - A140(T) Scole Village - Before and After Study " Report DOTP.25/S8 (Planning and Transportation Department, Norfolk C C, November 1993).

"Speed Limit Compliance - On main roads through villages in Essex and the effectiveness of physical speed reducing measures", by N J Aspden (Anglia Polytechnic University, March 1993)

"Speed Cameras in Oxfordshire", by D Hook, A Kirkwood, and, D Evans (Highways and Transportation, February 1995).

"A Review of Speed Camera Operations in the UK", by Mike Winnett (Proceedings Seminar J 22nd European Transport Forum).

"Reducing speeds in villages: the VISP study", by Allan Wheeler and Marie Taylor (Traffic Engineering and Control, April 95).

**ANNEX B1
CHECKLIST FOR TRUNK ROAD TRAFFIC CALMING SCHEMES**

SCHEME TITLE:

DATE:

ACTIVITY	Mark Yes or N/A as Appropriate
<p>1. SCHEME DEVELOPMENT</p> <p>1.1 Prepare scheme brief</p> <p>1.2 Carry out ' before' surveys as necessary</p> <p>1.3 Prepare outline programme</p> <p>1.4 HA & Initial public consultation</p> <p>1.5 Develop options</p> <p>1.6 Environmental appraisal: - Environmental Assessment - PAR</p> <p>1.7 Value engineering</p>	
<p>2. OPTION APPRAISAL</p> <p>2.1 Evaluate option Objectives - Safety (speed, accidents.) - Environment (noise, pollution...) - Accessibility (pedestrians...) - Transport integration (public transport & cyclists.) - Economic growth (travel demand)</p> <p>2.2 Public consultation as necessary</p> <p>2.3 Determine preferred option</p> <p>2.4 Safety Audit - Stage 1</p> <p>2.5 Forward completed checklist, Review Form and scheme details to TSE for advice where required.</p> <p>2.6 Submit application to TSS for Signs authorisation where applicable.</p>	
<p>3. DESIGN CONSIDERATION & IMPLEMENTATION</p> <p>3.1 Detailed design considerations: - Environmental - Signing and Markings - Lighting - Pedestrians - Cyclists - Public transport - Emergency Services - Parking</p> <p>3.2 Public consultation/ exhibition as necessary</p> <p>3.3 Detailed design of preferred option</p> <p>3.4 Safety Audit - Stage 2</p> <p>3.5 Implementation/construction</p> <p>3.6 Safety Audit - Stage 3</p>	

4. MONITORING

4.1 Carry out 'after' surveys

4.2 Assess effectiveness of implemented scheme.

4.3 Public consultation

4.4 Report on results of monitoring.

Shaded areas indicate consultations requirement at each stage of the preparation of the scheme.

ANNEX B2

TSE - REVIEW FORM FOR TRUNK ROAD TRAFFIC CALMING SCHEMES

To: Traffic Safety and Environment Division
SLVR, SCH, Southwark Street, London SE1 0TE

Title, Location of Scheme:

Name Of Maintaining Agent/ DBFO Company

Enclosures

Breif description of scheme and any other Information:
(Tick Box If Continued On Separate Sheet)

Area / Project Manager request:

Name:

Telephone:

Address:

Date: