Transport for Buckinghamshire

Traffic Calming in Buckinghamshire

A Guide for the Implementation of Traffic Calming Measures

July 2020

Over the past 20 years, a great deal of experience has been gained both nationally and in Buckinghamshire on the appropriate use of traffic calming. This booklet describes:

- The measures available
- Their effectiveness
- An indicative cost involved

Traffic calming is seen by many people as a positive solution, but by others as an unnecessary inconvenience. This booklet aims to help Parish and Town Councils find the right solution for their problems.

Traffic calming describes a wide variety of measures that can be used to reduce vehicle speeds and to encourage a steady and safe flow of traffic. Used effectively it can influence driver behaviour and improve road safety in both rural and urban areas.

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1.1 Overview

Speeding traffic in villages and towns and on rural roads across Buckinghamshire can result in:

- Intimidation to walkers, cyclists and horse riders
- Higher CO^2 emissions
- Noise pollution
- Increased risk of a collision
- Severance of communities (reducing social interaction and the use of local services)

Buckinghamshire Council (BC) acknowledges that many local communities are concerned with these issues, and this guide describes the different types of traffic calming measures that may be possible and gives an indication of what measures are suitable for different locations.

LTP4 (Local Transport Plan) policy 17 sets out measures to achieve its objectives relating to road safety. The Council will work with partners to support road safety and reduce the risk of death or injury on the county's highways through infrastructure improvements, road user training, promotion and education. The Council will work to ensure that new developments provide safe and suitable access and will promote a mix of engineering, education and enforcement activity focused on casualty reduction and prevention. The Council will use data to inform targeted education, training and promotional road safety initiatives, along with supporting national casualty reduction campaigns.

The Council is also committed to create an inclusive setting, ensuring the needs and safety of all highways users is considered when delivering traffic calming schemes.

Buckinghamshire Council's Highways Development Management Guidance document offers advice (in particular for new developments) to ensure that road safety requirements and the needs of highways users is met at the initial planning stages with emphasis placed on creating roads and streets which provide safe and suitable access for all modes of transport.

A Gradual Approach

Always try the least expensive methods of traffic calming first. These can be effective and include:

- Education, training and publicity (ETP)
- A request for speed enforcement (the responsibility of Thames Valley Police)
- Signing and lining
- Gateways

Many of these 'softer' measures are explained in Section 2 and 4.0 of this guide.

Physical Traffic Calming Measures

As the local Highways and Transport Authority, Buckinghamshire Council has considerable experience of implementing physical traffic calming schemes in urban and rural settings. The Council is keen to see its key principles adopted for local community funded schemes:

Key principles:

- Ensure that the majority of drivers, local residents, and other users support the proposals.
- Ensure that public participation in education campaigns run by the Council is encouraged before, during and after the introduction of physical traffic calming measures.
- Ensure that schemes do not detract from the Council's transport polices and strategies. They should add value and help tackle congestion, improve safety, enhance access, and improve the environment.
- Consider the use of vertical features for casualty reduction purposes only or as a last resort when other initiatives have failed.
- Provide technical support and guidance to parishes and community groups, at a cost, in response for a request for traffic calming measures, and ensure that agreed proposals meet all current government guidelines.
- Review schemes to ensure they work, and learn from previous experience.

1.2 Schemes Promoted by Local Communities

It is important to understand the purpose of traffic calming measures before choosing a scheme. Choices include, but are not limited to:

- Traffic signs
- Road markings
- Gateways
- Chicanes
- Traffic islands
- Surface treatments
- Road humps, speed cushions or speed tables
- A review of the speed limit.

There must be no detrimental effect on road safety, public transport or the road network and the scheme should show an improvement on casualty reduction.

For local community funded schemes, the Buckinghamshire Council as Local Transport and Highway Authority will need to approve the scheme to ensure it complies with public liability issues and national guidelines and standards.

To give your 'local community funded scheme' the best chance of approval by the Council, it is important to justify:

- A demonstrable safety problem with a record of personal injury collisions where inappropriate speed is a contributory factor.
- A perceived safety problem where people feel threatened by the speed, volume and/or type of traffic.
- The area is considered unsuitable for the type/volume of traffic passing through it. This will be assessed by Transport for Buckinghamshire (TfB).

- That vehicle domination of the street space can significantly diminish the quality of life for residents, shoppers and traders.
- The need for a deterrent against unsuitable traffic such as heavy goods vehicles and 'through traffic'.
- Support from Local Council and Councillor(s)

Any one or a combination of these factors may lead to consideration of the use of traffic calming; however, the desired outcome must be clearly understood at the outset to ensure the most appropriate scheme is selected.

Once initial thoughts on the desired scheme have been considered and a funding stream identified, they should contact TfB via Participating Authorities Commissioning Coordinator to prepare and submit a brief for the potential scheme (Pacs-coordinator@buckinghamshire.gov.uk). TfB will then assess the proposals and provide a project initiation document (PID) which will provide brief assessment of proposals, likely costs and timescales.

1.3 Consultation Process

It is a legal requirement under the Road Traffic Act 1984 to undertake consultation and if required, implement a Road Traffic Regulation Order prior to implementing certain traffic calming features or restrictions on the public highway.

Traffic Regulation Order (TRO) is a legal instrument that enables the Highway Authority (Buckinghamshire Council) to limit or prohibit the movement of traffic on the highway. They apply to the regulation of speed, weight, movement and parking of vehicles as well as regulating pedestrian movement. In most cases, TROs are made as a result of requests from local communities or the police to address specified road safety issues.

If drivers do not comply with these orders, they are guilty of an offence for which the courts may impose penalties such as fines, licence points or even disqualification.

Experimental Traffic Regulation Order is like a permanent traffic regulation order in that it is a legal document which imposes traffic and parking restrictions such as road closures, controlled parking and other parking regulations indicated by double or single yellow line etc. The Experimental Traffic Order can also be used to change the way existing restrictions function.

An experimental order can only stay in force for a maximum of 18 months while the effects are monitored and assessed. Changes can be made during the first six months of the experimental period to any of the restrictions (except charges) if necessary, before the Council decides whether or not to continue with the changes brought in by the experimental order on a permanent basis.

There are typically three types of consultations which TfB will undertake:

Opinion Surveys – These consultations are not a statutory or legal requirement and tend to initiate from a request to address an issue relating to the public highway. At this stage, the consultation seeks to gauge ideas and opinions from the public or to identify issues and how they could be addressed or what steps the Council should take to improve the situation. Some possible suggestions may be offered by the Council which the public can consider but can alternatively offer ideas beyond the suggested options.

Informal Consultations – Although these consultations are not a statutory or legal requirement, the Department for Transport (DfT) state; it is good practice to consult local groups to gauge their support on proposals. Schemes on which we may informally consult with the public may include the installation of village gateway features or the installation of a vehicle activated sign. Gaining local support through informal consultations enables communities to input into the final proposal and allows a process for them to share their views and opinions. Depending upon the complexity and/or potential for objections, an informal consultation may be needed. For this we would write to any properties directly affected, and usually to statutory consultees, to outline our initial proposals and why we are making them. This allows us to identify any major problems before we progress to the formal consultation stage, and amend our proposals accordingly.

Statutory Formal Consultations – This type of consultation is where there is a requirement set out in law to consult specific groups of people/organisations on proposals which may change the way we use the public highway. This is carried out by the Council. We advertise the proposals by means of a Public Notice published in a local newspaper. A copy of the Notice is also posted on site, at regular intervals in the affected roads, and is sent to all directly affected residents and statutory consultees.

A copy of the Notice and any proposed Order, along with supporting documentation, is made available for public inspection at council offices as specified in the notice.

A consultation period of 21 days (minimum) from the date of publication is allowed for anyone who wishes to comment (i.e. object or support) on the proposals to do so in writing. All written comments will be taken into consideration when the final decision about how to proceed is taken by the Cabinet Member for Transportation.

When considering any objections, the Cabinet Member must decide (a) to proceed with the scheme as advertised, (b) modify the scheme or (c) abandon the scheme.

The DfT regulations state that local people must be consulted about certain proposed traffic calming schemes.

Public engagement is vital to achieve local acceptance and to ensure that traffic calming measures are effective.

Consultation with the public and other key stakeholders is important to:

- Identify the problems
- Define the objectives of the scheme
- Gain support from the public (this is likely to be more successful through early involvement)

You must consider the needs of the emergency services including:

- The routes they use
- The impact on their response times
- Any possible discomfort/injury for the vehicle occupants

The Council can oversee consultations (costs will need be covered by external funding) on community funded schemes to ensure that they meet required standards and are fair and accountable. It will also ensure that they are carried out in the same way as all other Council consultations.

Adequate time should be allowed for all consultees to prepare a response to a proposal.

A typical consultation list would include:

- Emergency services (ambulance, fire and rescue)
- Local residents and the general public
- Thames Valley Police (statutory requirement)
- RAC and AA
- Freight transport and road haulage associations
- Parish and/or Town Council
- National Farmers Union
- Disabled Access Forum
- Local cycling groups
- Pedestrian associations
- Buckinghamshire Councillors and key departments

Important traffic calming legislation and guidance includes:

- The Traffic Calming Regulations 1999
- The Road Humps Regulations 1999
- The Road Traffic Regulation Act 1984
- Local Authorities Traffic Orders (Procedure) Regulations 1996
- The Highways Act 1980
- DfT Local Transport note1/07 and 1/08
- DfT Manual for Streets (MSF1) 2007 and MSF2, 2010
- The Traffic Signs Regulations and General Directions 2016 (and any subsequent amendments).
- Buckinghamshire Council revised policy on lighting

National legislation can be found on the following websites:

www.dft.gov.uk

www.legislation.gov.uk

1.4 Scheme Promoter

The Council may promote and fund schemes as part of the capital programme, although this is likely to be in exceptional circumstances only. For example, where there is a high incidence of personal injury collisions or developer funding contributions are available to mitigate the effects of increased traffic resulting from new development.

In all other situations, traffic calming schemes will need to be funded by the local community boards.

It is strongly recommended that a Parish Council develops a funding strategy at an early stage. This strategy should aim to raise the funding to design, consult, construct and review the scheme, allowing a suitable contingency for post-implementation modifications. Some schemes (for example, those with vehicle activated signs) will also need a budget for future maintenance of the equipment.

Capital Funding

TfB receive Central Government Capital funding to deliver schemes to improve road safety on the highway network. The current annual budget is approximately £250,000 and delivers between 6 – 8 schemes per year. The current method of prioritising local safety scheme sites is by identifying routes that have a high rate of fatal or serious injury collisions per km or sites where at least 5 injury collisions (of any severity) have occurred within a 50m radius, in the last 5 years. These collision 'cluster' sites are ranked by a 3,3,1 weighting for fatal, serious and slight to ensure that Buckinghamshire Council (BC) are addressing the sites with the highest severity collisions.

Developer Funding

Planning obligations, also known as Section 106 agreements (Town & Country Planning Act 1990) are legal agreements made between local authorities and developers and can be attached to a planning permission to make acceptable development which would otherwise be unacceptable in planning terms. All planning obligations have to meet the following three tests:

(a) necessary to make the development acceptable in planning terms;

(b) directly related to the development; and

(c) fairly and reasonably related in scale and kind to the development.

The Highway Authority is only able to secure S106 funding towards traffic calming in order to mitigate a development's impact, where it can be fully justified that it meets these three tests.

Commuted Sums

Commuted sums are financial contributions made by third parties to Highway Authorities as compensation for taking on the future maintenance responsibility for newly created highways or highway improvements. They are typically, although not invariably, secured through legal agreements made with developers and landowners under Sections 38 and/or 278 of the Highways Act 1980 ("the 1980 Act").

Community Boards

Community Boards are a key part of the Buckinghamshire Council's approach to locality working and enable local conversations between key stakeholders about local priorities, areas of interest or issues with the aim of finding collaborative ways to resolve them.

There are 16 boards covering the county and whilst they share common values and approaches, each board has its own unique look and feel to reflect the needs of the local area. Board membership is open to all but typically includes all Buckinghamshire Councillors within the community board area as well as all Town and Parish Councils, Voluntary and Community Sector Groups, and residents.

Community Boards will;

- represent the voice of local people
- influence decision making and service delivery
- bring people together to strengthen communities
- focus discussion on key issues for local residents
- identify needs and creative solutions
- explore areas of interest

Local Priorities Funding for Highways Schemes

Each Community Board has a local delegated budget which can be allocated to projects and schemes that address agreed local priorities. This budget is limited, however, and therefore, depending on the volume and cost of the schemes, they may require some match funding.

Schemes will require local support so it is a good idea to discuss them with your local Buckinghamshire Councillor and / or Parish Council as well as the Community Board Coordinator. If you are interested in putting forward an application for a Highways scheme, please contact your Community Board Coordinator who will be able to provide more information and advise you of the deadline. You can find out who your Community Board Coordinator is by emailing **localities@buckinghamshire.gov.uk.**

2.0 Partnership Approaches

Speeding is anti-social and often requires police intervention. However, local initiatives may be used to encourage drivers to slow down.

Evidence suggests that it is often local drivers who speed in their own communities and the Council is keen to work with Parish Council's to encourage slower speeds. The local community can get directly involved in the ways set out below:-

Education, training and publicity (ETP)

Road safety education, training and publicity campaigns aim to change habits and driving attitudes. Traditionally used on their own, they can also support the introduction of physical traffic calming measures.

Advertising and publicity campaigns can quickly reach a large audience and enable the delivery of simple measures in a coordinated manner.

Speed education campaign

Transport for Buckinghamshire promotes a speed reduction campaign which aims to tackle the problems caused by inappropriate and excessive speed in local communities. The campaign consists of educational campaign materials and online media to influence behaviour on the road and ultimately reduce speeding incidents. Details about this may be found at https://www.buckscc.gov.uk/speeding

Community Speed watch

Thames Valley Police run a Community Speed watch Scheme which may operate in your area. For more information contact your Neighbourhood Team via www.police.uk or by telephoning 101.

2.1 Reporting speeding drivers

Thames Valley Police (TVP) is responsible for all matters concerning enforcement of traffic laws including speeding.

Concerns regarding speeding should initially be dealt with by the relevant Thames Valley Police (TVP) Neighbourhood Team who can be contacted via www.police.uk or by telephoning 101.

Please note that BC has no powers to enforce speed limits.

2.2 Supply Chain Partnership

Transport for Buckinghamshire has partnered with a number of competent suppliers to work with for the delivery of our highway projects. We frequently undertake tendering exercises to seek best 'Value for Money' whilst maintaining quality control. Fostering good relationships with our suppliers has enabled us to secure competitive rates during large scale works.

3.0 Supporting Evidence Collection

3.1 Overview

All requests should be sent to the Council's office via the local Parish or Town Council. You should explain why you need a scheme, possible solutions, and any other relevant information.

The Parish Council should contact their Local Area Technician (LAT) who will visit the site with local representatives to discuss the problems and various options. You will also receive more detailed information on how to progress schemes, consultations, costs and other relevant issues.

Community funded schemes will be progressed as soon as resources allow. This will depend on the number of applications and scale of the schemes involved. It is important that good evidence is collected to support any request for traffic calming. This evidence could include the following:

- Local residents' views collected through a survey
- Local Parish Council views
- Specific speeding information supplied by Local Neighbourhood Policing Teams
- Traffic speed and flow data collected from speed tubes (see section 3.2)
- Speeding information supplied from Community Speed watch (see section 2.0)
- Number of accesses along the affected length of road
- Number of properties and junctions along the affected length of road
- Use of the road, for example, abnormal load, emergency or bus route

3.2 Speed Tubes

The Council can collect traffic speed, class and flow data via the installation of a temporary automatic traffic counter (ATC) and a pair of pneumatic tubes.

Data is recorded by direction with the traffic survey usually being carried out over a seven-day period on the completion of the survey a report is supplied in excel format.

The current cost of carrying out an individual survey is £412+VAT (2020-21 cost), please email tfbtrafficinfo@buckinghamshire.gov.uk in order to discuss requirements and timescales.

4.0 Case Studies and Traffic Calming Measures

The following section explores the various Traffic Calming and road safety features which can be implemented to reduce vehicle speeds, collisions and improve the overall road safety for all highway users.

In addition to the options which are available, we have provided some indication to the advantages and disadvantages of such features, along with indicative costs to implement the feature.

Parish Councils can use these examples to develop initial ideas for their area and the likely costs involved. Please note that the costs provided are indicative only and that actual costs can significantly change depending on the site conditions. For example, it is assumed existing utility services will not require relocating or be diverted as part of the implementation of the scheme. Diverting utility services need to be undertaken by the service provider and would tend to increase the project costs to a point where they may become prohibitive.

The indicative costs provided take into consideration the various overheads and provisions required to enable the works to be undertaken safely. Safety of workers and the general public is paramount during all highway projects.

Below are the costs which have been considered when providing an indicative costing:

- **TfB staff costs** which will include the provision of feasibility studies, design, site supervision, project management and any associated costs required to deliver the project.
- **Temporary Traffic Management** - this could be road closures, lane closures, temporary traffic lights etc. This is to ensure the safety of all road users and workers.
- **Temporary Traffic Regulation Orders** – for the provision of a road closure, temporary speed limit or prohibition of the movement of traffic.
- **Road Safety Audits** - The Road Safety Audit will identify potential road safety issues or problems that may affect all users of the highway and to recommend measures to eliminate or mitigate these problems.
- **Consultations** – There is a legal requirement under the Highways Act to formally consult with the public before the implementation of certain traffic schemes. Consultation costs can include advertising of public notices in a local newspaper, erection of notice boards and letters delivered to local residents.
- **Surveys** – It may be necessary to undertake speed or volume surveys to establish the suitability of a traffic calming or road safety scheme. Surveys can include topographical surveys and other environmental surveys.
- **Works costs** – This cost pertains to the indicative costing of delivering the works on the ground. Where it may be a requirement or strong likelihood that we will need to carry out resurfacing works or installation/upgrading of street lighting, the cost will be factored into the cost examples.

4.1 Traffic Calming Tools Used Across the County

4.1.1 Traffic Signs

Signs are used with traffic calming measures and also in isolation, for example, speed limit signs.

Standard traffic signs provide clear warnings about the road ahead. Their size and position are subject to strict guidelines set by the Department for Transport (DfT).

Signs generally fall in to three categories:

Warning **Information** **Regulatory**

They are used on the public highway to provide information.

Typical Cost	
The typical cost for a single sign and post installation is approximately £1400 which will include sign, post, associated materials, design services and traffic management. The costs can vary significantly if the sign face is required to be illuminated; in which case, a power supply will need to be provided to a sign light. A typical cost for an illuminated sign with all the ancillary works and materials will be £3000.	
Pros	Cons
• Inexpensive • Clear message for drivers • Highly visible to drivers	• Too many signs can confuse drivers • May 'urbanise' a location, especially in rural areas • Inappropriate signs are currently attracting adverse media attention • 30mph speed limit repeater signs are illegal in street lit areas

CASE STUDY

TfB recently delivered a scheme which involved the provision of a new single 'road narrows both sides' warning sign and post in Chalfont St Giles to forewarn drivers of the change in road nature. The exact location of this scheme was Back Lane on the offside southbound approach towards Deanway. The total cost of this scheme including the design, ordering and installation of a single sign and new post and came to £1400.

A scheme was recently delivered in Little Chalfont Nature Reserve on access road to Dr Challoner's School in Little Chalfont to increase the awareness of pedestrians crossing to and from the access to the new Nature Reserve. A new 'pedestrian crossing & supplementary plate' was supplied and erected. The total cost of this project was £1480.

4.1.2 Road Markings

Road markings are an extremely effective way of communicating information to drivers, however, their use should be carefully considered. Inappropriate road markings can intrude on the landscape and be misleading.

4.1.2.A Speed Roundels

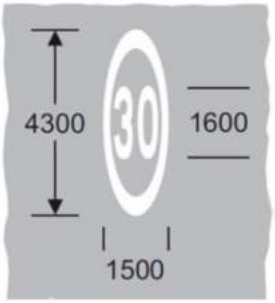
These can be laid on the road surface, typically at the start of the speed limit. They provide additional impact when entering residential areas such as villages or locations where there are high numbers of pedestrians, for example, near schools.

Roundels can only be provided next to post-mounted terminal or repeater speed limit signs. The DfT will only allow them to be used without speed limit signs on posts in protected locations such as the Chilterns Area of Outstanding Natural Beauty. TfB will need to seek approval from the DfT in these instances.

Where roundel markings are permitted to be used instead of repeater signs on posts, they will require careful maintenance. If they become worn, then the speed limit will become ineffective or unenforceable.

Typical Cost	
The typical cost would include the provision of booking the road marking contractor for a minimum daily charge and the necessary traffic management. The typical cost for the installation of a road marking will be £2500. The minimum day rate would enable up to 8 roundels to be laid.	
Pros	Cons
• Inexpensive • Effective message reinforcement • Can be used in isolation (with special permission)	• Can fade from traffic wear • Need regular maintenance, with potentially higher long-term costs than conventional posts • Visibility is affected in poor weather conditions • Can be unsafe for motorcyclists as the white paint is slippery when wet

CASE STUDY



TfB recently reduced the speed limit on Framewood Road, Wexham from the National Speed Limit to 40mph. As part of the work, we installed new speed limit signage and new speed limit ‘40’ roundels / road markings. A total of four speed limit roundels were marked at a cost of £1480. The total cost to deliver the speed change was approximately £16,000.

4.1.2.B Dragons Teeth

These white markings give the appearance of reducing the lane width so that drivers slow down. They are most effective when used with other measures such as gateways on approaches to villages. Typically, a design would include 17 pairs of dragons' teeth gradually getting larger as you approach the entrance to a village.

These road markings are only marked out on an approach to a reduced speed. They are widely used across the County and are recognised as part of a village entry feature.

Typical Cost	
The typical cost would include the provision of booking the road marking contractor for a minimum daily charge and the necessary traffic management. The typical cost for the installation of this road marking will be £2500.	
Pros	Cons
• Creates an illusion that the road is narrower than it is • Inexpensive • Do not generate too much noise • Highly visible	• Limited impact when used in isolation • Can be perceived as unsightly • Constant over-running of lines will lead to maintenance issues

CASE STUDY

TfB delivered a scheme in 2017 on the A416 Amersham Road for Chesham Bois Parish Council which involved installing Dragons Teeth road markings, which consisted of 17 pairs of triangles (teeth), laid on the approach to the existing 30mph speed limit on the A416 Amersham Road. The total cost of this scheme including the management fees, staff fees, treatment cost, and ancillary costs came to approx. £2500. The 'dragons' teeth' can be seen in the picture to the right.

4.1.2.C Central Hatching

These markings can only be used in the centre of roads that are at least seven metres wide.

They work by appearing to reduce the width of the lanes. This can discourage speeding and overtaking. If the road is at least eight metres wide, right-turn lanes may be added.

The cost depends on road length and can increase significantly if cats' eyes or intelligent road studs have to be moved or installed.

Typical Cost	
To install the single feature of central hatching, cost is approximately £7 per m2. However, a minimum fee for the contractor's visit will be applicable, typically costing £2500. A minimum visit is likely to enable 80 metres of central hatching to be installed.	
Pros	**Cons**
• Inexpensive • Provide lane guidance • Solid hatchings are enforceable • Provide added protection when turn lanes or central refuges are incorporated	• Not as effective when used in isolation • Will have a possible 'urbanising' effect, especially on rural roads • A minimum road width is required • Constant over-running of lines will lead to maintenance problems • White edge lining may increase driver speed • Can potentially narrow carriageway and push motor vehicles closer to cyclists

CASE STUDY

Following high incidence of injury collisions, TfB delivered a scheme on the A413 Buckingham Road from the roundabout to Whitchurch. This scheme involved installing road markings, high friction surfacing and studs after resurfacing the road; the central hatching was also red backed in some areas as can be seen in the picture.

The cost for this scheme came to approximately £44,000. This cost included all of the road markings, from road studs, central lining, red backed central hatching, red backed SLOW markings, drying the road surface, management fee, staff fees, treatment cost and all other ancillary costs.

4.1.2.D Rumble Strips

Rumble strips are short, raised road lines that cause a warning vibration when driven over. They can alert drivers to hazards or a change in driving conditions. Studies show they can reduce speed by 2mph.

Rumble strips are most effective when used with other measures such as gateways on approaches to villages. Due to the noise created, rumble strips should not be sited near residential areas.

Typical Cost	
The typical cost install rumble strips at a single location is approximately £3000. This will include 3 sets of rumble strip markings, in both directions when approaching a feature such as a hidden side road.	
Pros	**Cons**
• Attract drivers' attention • Create audible and visible (depending on colour) effects • Can be laid into the road or, simply and cheaply, over the road surface	• Creates noise and must be sited away from residential areas • Must be clearly visible at night • The effect largely depends on coarseness of the strips • Does not have the same effect when used in isolation • Some evidence suggests that drivers may speed in an attempt to reduce effects

CASE STUDY

TfB delivered a scheme in Newton Longville on Whaddon Road to refresh some existing rumble Strips. The total cost of this scheme came to £1,538.16. Please note that this scheme was only to refresh existing road markings.

TfB delivered a scheme in Waddesdon where rumble strips on either side of Waddesdon Greenway road crossing were installed to highlight the presence of cyclists to approaching drivers. This particular scheme costed more; typically the cost for one installation is largely the same as several if all works can be completed in one day. The total cost for scheme in Waddesdon was £4000 which includes for consultation and decision process, design, procurement and implementation.

4.1.2.E Bar Markings

These are a series of yellow 200mm-wide bands, with a recommended height of 3-4mm (approximately the same as centre line markings). They can be effective when used with other measures such as gateways on the approaches to villages, or when approaching a lower speed limit. However, their common use is on principal high speed roads when reaching a roundabout or adjoining road.

Bar markings are distinct from rumble strips as they are not designed to produce a 'drumming' sound.

Bar markings are generally installed on high speed roads and are used when approaching junctions or roundabouts. The bar markings offer a clear visual warning that motorists should start to reduce their speed.

Typical Cost	
The typical cost for the installation of bar markings is £7,000 per approach. Costs are generally higher than the usual road markings due to the large lengths of road which need to be marked, the time taken by the contractor setting out the markings correctly and largely in the traffic management costs.	
Pros	Cons
• Inexpensive • Highly visible • Do not generate too much noise	• Because they cause low level noise, they should not be placed too close to homes • Not suitable for sharp bends or steep gradients as motorbikes and cycles may lose traction • Will have a possible 'urbanising' effect, especially on rural roads • Constant over-running of lines will lead to maintenance issues

CASE STUDY

TfB have installed bar markings along the Stoke Hammond Bypass. This work was carried out as part of the major resurfacing project scheduled for this road. The cost to install the bar markings was £22,000 with a total project cost of £4.3m. The bar markings have been installed at six different locations along this stretch of road.

4.1.2.F Mini Roundabouts

Mini roundabouts will have a calming effect but should only be installed in 20/30mph zones at three-armed junctions which have equal and/or substantial traffic flow.

The mini roundabout must be more than one metre in diameter but less than four metres, and must not exceed 125mm in height. The alignment of the road may need adjustment to slow down approaching traffic. Appropriate street lighting and illuminated signs will be needed and doming of the roundabout centre is recommended.

However, the current design standards do state that a mini-roundabout must not be used as a speed reduction measure in isolation. Where a mini-roundabout is used within a traffic-calming scheme, speed reduction must be achieved by means of suitable speed reduction measures on the approach. If the required speed reduction cannot be achieved, then a mini-roundabout must not be provided.

Typical Cost	
The typical cost for installing a mini-roundabout without any geo-metric changes to the road will cost approximately £25,000. However, each site would need to be assessed independently and past cases have shown that costs can increase to £100,000.	
Pros	Cons
• Reduces speed on all arms • Easy to install if no other works are required • An alternative to re-designing the junction layout	• Costs can escalate drastically if lighting and/or road realignment is required • Very strict design guidelines • Creates extra signs • Has produced mixed results as a speed reduction measure • Any underground services may need to be diverted

CASE STUDY

BC has installed a mini roundabout on Wendover Way, Aylesbury. The mini roundabout was installed to manage the flow of traffic approaching the junction in three directions. Whilst TfB did not deliver this scheme, we anticipate the cost for a similar arrangement would be in the region of £25,000. TfB have not recently installed any mini-roundabouts.

4.1.2.G Road Marking Removal

Several surveys show that the clearer the road marking layout, the more positive drivers are in their actions and general behaviour.

This approach has been successful in a number of locations but considerable judgement is required to minimise any risks resulting from removing signs and road markings. Consideration has to be given to traffic flows, existing vehicle speeds, location, and numbers of vehicles using the road. This approach is still being trialled.

The preferred methodology for removing road markings is to blast the road marking off the road surface using high pressured water-jets, providing the road surface is in sound condition. Should the road surface not be suitable for high pressured jetting, it may be necessary to resurface the top layer of the road.

Typical Cost	
A day charge of £4000 applies for the deployment of a hydro-blaster (high pressured water jetting). The cost to resurface over road markings can vary with costs starting at £5000. An additional £1500 will need to be added to either option for the management of the works.	
Pros	Cons
• Can encourage reduced speeds by removing lane delineation • Reduces road marking clutter • Can remove 'urbanising' effect within rural villages	• Can be very expensive • Jet blasting can damage existing road surfaces • Removes guidance provided to motorists through the use of visual road markings

CASE STUDY

TfB has deployed the technique of hydro-blasting when removing road markings over various locations in the County. This method is suitable for permanent line removal but does require the road surface to be in a reasonably good condition, else will leave scarring to the road surface.

Whilst cheaper alternative solutions are available, most do not remove the lines entirely and simply mask over the top, which in time requires a future revisit for further treatment.

4.1.3 Road Surfacing

Changing the road appearance is an important technique in altering a driver's behaviour on the road. Drivers can be encouraged to slow down through perceptual techniques by breaking up lengths road with visual measures such as coloured road surfacing or by changing the textures of the road surface.

4.1.3.A Coloured Road Surfacing

Coloured surfacing is commonly used as part of a gateway feature or to emphasise a change of environment such as the approach to a residential area. It can also be used to highlight speed roundels or other painted signs on the road.

It is usually laid in 8-12m strips and accompanies other features such as slow or warning signs. Its effectiveness is variable on its own but can help to highlight a hazard such as a road junction or cycle way crossing. The surface may be prone to fading. Other materials and more fade-resistant materials are available, but are more expensive.

Typical Cost	
The typical cost for installing coloured road surface is approximately £5,000 which would for example include a red patch upon entering a village (two approaches) and a red patch in advance of the village accompanying a warning road marking such as 'SLOW'.	
Pros	Cons
• Relatively inexpensive • High visual impact • Can be used to denote an approaching change in conditions • Can be used to highlight road markings	• Should not be used in isolation, as without accompanying signs no specific message is conveyed • Prone to fading and may require further carriageway repairs prior to laying, to ensure longevity • Can have an urbanising effect

CASE STUDY

The use of coloured road surfacing has been used at various locations across the County. We recently delivered a scheme on the A413 Buckingham Road from the roundabout to Whitchurch. This scheme involved installing road markings, High Friction Surfacing and studs after resurfacing the road; the central hatching was also red backed in some areas as can be seen in the picture.

The cost for this scheme was approximately £44,000. This cost included all of the road markings, from road studs, central lining, red backed central hatching, red backed SLOW markings, drying the road surface, management fee, staff fees, treatment cost, and all other ancillary costs.

4.1.3.B Textured Road Surface

Textured road surfacing is available in various patterns and colours. It is normally laid up to 15mm above the road to resemble block paving or cobbles. This feature is designed to make a noise, warning the driver of a change in driving conditions. Because of the noise, this feature should not be sited near residential areas.

Studies have shown that speeds are reduced by up to 5mph. It has limited success when used in isolation but works well with other measures such as gateways on approaches to villages.

Typical Cost	
The typical cost of installing a feature of this scale with a sub-contractor is around £12,000.	
Pros	Cons
• Does not have the same urbanising effect as coloured surfacing • Does not fade • Enhances gateway entries • Good levels of speed reduction can be achieved	• More expensive than coloured surfacing • Must be away from houses due to noise levels • Does not have the same effect when used in isolation

CASE STUDY

TfB delivered a scheme to replace the existing grass island in Barracks Hill in Chalfont St Giles with a low profile traffic island with kerb surround. The scheme involved suitably placing road markings and installing advance 'give way' road markings to highlight the junction.

The total cost of this scheme came to £12,472 however this project was completed in 2015/2016 so prices for the same type of scheme would be much higher if considered today.

4.1.4 Gateways

Gateways are used to highlight the change from a rural road to a more populated area. A popular type of gateway replicates a five-barred farm gate. These can often be fitted with a village or town nameplate (as shown below). Ideally, gateways should be located at the start of a speed limit and can include road surface treatments and lining such as dragon's teeth.

For safety reasons, gateways must be collapsible; masonry or metal gates are unlikely to be considered.

Typical Cost	
The typical cost for a pair of gateway features installed at the entry to a village is approximately £5,500. Adding custom design logo's or emblems, including name plates can increase the cost of the feature.	
Pros	Cons
• Relatively inexpensive • Can reduce speeds by up to 5mph • Increases driver awareness of their environment • Different styles of gateway can reflect the particular character of an area • Defines the boundary of a village or town	• Limited effectiveness if used in isolation • Often limited room on verges, due to the verge width • Speed limit signs and village nameplates cannot always be placed at the same location • Department for Transport authorisation may be required for certain designs

CASE STUDY

TfB recently introduced a scheme in Waddesdon where gateway features were installed at several entry points into the village. The cost for the gateway installations was £13,000. The project itself includes the installation of coloured surfacing, bollards, a vehicle activated sign, verge markers, improved white lining and realignment of some kerbing. The overall cost of the scheme was approximately £64,000.

4.1.5 Horizontal Measures

4.1.5.A Road Narrowing

Road narrowing simply reduces the width of the road. This could be achieved in a number of ways; however the technique involves extending the curb at a junction entrance with a bollard on each side.

Motorists will need to drive more carefully in a narrowed section of road to keep their vehicle in the correct road position, which may result in slower vehicle speeds.

In addition, road narrowing can also be used to help pedestrians cross the road more easily particularly when the kerb is dropped with tactile paving where the pavement slopes towards the road.

Typical Cost	
The typical cost to narrow a single road junction is in the region of £12,000. Dependant on its location, illuminated bollards or additional street lighting may be required and can increase the cost.	
Pros	Cons
• Targets a specific part of the road • Can be used on junctions • Can prevent vehicle parking • Make it easier for pedestrians to cross • Emergency vehicles should be able to pass without slowing down	• Not as effective as vertical treatments • Managing water drainage could be complex and costly • Cyclists may feel intimidated by some vehicle drivers' behaviour at road narrowing

CASE STUDY

TfB has installed various narrowing's along a section of High Street, Winslow. The features were installed to narrow the road width and encourage reduced speeds along the High Street. The shape and profile of the narrowing's varied along this section of road to best suit the existing road layout and achieve reduced vehicle speeds.

4.1.5.B Chicanes and Priority Systems

Chicanes are also known as 'single lane working chicanes' or 'priority narrowing'.

Single lane chicanes require one direction of traffic to give way to oncoming vehicles. The chicane normally consists of a raised kerb and bollard in one half of the road, with a sign to explain the vehicle traffic priority. For the lane without traffic priority, there are Give Way markings and hatching on approach to the chicane. They are most effective if used by more than 500 vehicles a day, with no heavy bias in one direction.

Groups of chicanes are normally placed with alternating priority down a road, so that each direction of vehicle traffic may have to stop and give priority in equal amounts. All narrowing's are to be illuminated.

Narrowing does can create problems for cyclists, and farmers who use larger agricultural vehicles may object. They can cause sudden braking or acceleration and may also reduce available parking space. Crashes may result when drivers make inappropriate or late decisions about giving way.

Typical Cost	
The typical cost for installing a single priority narrowing system will be in the region of £25,000 which will include all kerbing works, road markings, illuminated signs and bollards. If there is a requirement to upgrade or relocate street lighting columns and include improved drainage infrastructure, this may significantly increase the project costs.	
Pros	Cons
• Do not cause any vehicle passenger discomfort (in comparison to vertical treatments) • Most chicane designs allow cyclists to bypass them • Emergency vehicles may be able to travel faster around a chicane compared to vertical treatments	• Motor vehicles with priority may not reduce their speed • Motor vehicles without priority may race to the chicane before an oncoming vehicle approaches • May cause long delays if there is increased vehicle traffic

CASE STUDY

A number of years ago the Council installed priority narrowing systems along Main Street, Weston Turville. The implementation of this traffic calming feature has been established for many years. The cost to install a similar traffic calming feature would cost approximately £25,000. Typically, a series of these priority systems would be installed over a long stretch of road although they can be installed in isolation.

4.1.5.C Central Traffic Islands

Traffic islands restrict two-way traffic flow into narrower lanes or provide a refuge for pedestrians. In general, there must be a minimum lane width of three metres either side of an island. If the island is a pedestrian refuge, it must be a minimum of two metres wide. Buckinghamshire Council's policy is that they must be illuminated.

Central traffic islands can reduce vehicle speeds by up to 5mph, depending on the lane widths. However, they can create problems for cyclists. Farmers who use large agricultural vehicles and the emergency services may object if access is hindered. This means that road widening may be required. Islands are often difficult to site in residential areas where they conflict with accesses and on-street parking.

Typical Cost	
The typical cost for installing a single traffic island (with two illuminated solar powered bollards) will be in the region of £15,000. Where it is necessary to widen the road to accommodate a traffic island / pedestrian refuge, the cost will increase significantly.	
Pros	Cons
• Can be effective in reducing vehicle speeds • Can be tailored to fit different road widths and conditions • Encourages lane discipline • Can be designed as a pedestrian refuge	• Can be expensive • Must be illuminated • Can be difficult to site in residential areas as a minimum road width is required • Can cause problems for cyclists • Collisions with islands can occur • Larger vehicle users and the emergency services may object

CASE STUDY

TfB recently implemented a scheme in Marlow which included the installation of two traffic islands designed to segregate opposing lanes of traffic in addition to providing a facility to enable pedestrians to cross and take refuge. The cost to install these two features was approximately £24,000 with the total project cost at £55,000 (which includes some resurfacing, kerbing works and parking restrictions being installed).

4.1.6 Vertical Measures

4.1.6.A Speed Humps / Raised Tables

Speed humps can be rounded or block-shaped where a flatter profile is required and extend the full width of the carriageway (or in the case of a raised table, over an extended area often encompassing side roads and junctions). They are usually constructed in tarmac for cost-effectiveness although the use of blockwork is becoming more common in new developments. They can be effective in reducing speeds to about 20mph depending on their profile and spacing. Their height and frequency are controlled by regulation. It is recommended that a traffic calming feature is installed prior to vertical traffic calming measures. There should be a roundabout, sharp bend or road narrowing on the approach to the humps to slow traffic down. Speed humps should not be installed on steep gradients.

Vertical measures will only be considered where other less obtrusive and cost-effective measures have not been successful. Requests will be assessed on an individual basis taking into account the collision history and road layout.

Typical Cost	
The typical cost for installing a speed hump or raised table will be in the region of £40,000. However, costs can significantly increase if street lighting or drainage improvement works are required to support the infrastructure.	
Pros	Cons
• Can be very effective in reducing vehicle speeds • Can provide pedestrian crossing places if flat-topped • Cover the full road width and can be installed without affecting on-street parking	• Can only be used in areas with a speed limit of 30mph or less • Must be illuminated to highway lighting standards • May cause discomfort to bus passengers and patients in ambulances • Braking and acceleration noise plus vibration can make them unacceptable to residents

CASE STUDY

In 2015, TfB installed a speed hump in Burkes Road, Beaconsfield as part of a wider scheme which focused on improving the on road cycling facilities along this length of road. The cost to install the speed hump was approximately £32,000 which included the resurfacing of a section of carriageway and footway adjacent to the speed hump and associated road markings.

4.1.6.B Speed Cushions

Speed cushions are similar to road humps and have the same constraints relating to height, frequency, and lighting.

Their effectiveness depends on the width, height and profile of the cushion. Buses and emergency service vehicles can straddle narrower cushions, but wider cushions are more effective in reducing speeds.

Speed cushions may only be installed in areas where there is a system of street lighting and must also have advance signing (traffic signs require to be lit) of the first set of speed cushions to pre-warn motorists.

TfB have not recently installed any speed cushions within the County and have found that recently, more speed cushions have been removed than installed.

Typical Cost	
The typical cost for the installation of speed cushions is approximately £5,000 per pair and generally they are installed as a series of speed cushions extending the length of a road. In addition to this, an anticipated cost of £8,000 will be required to enable a full consultation to be undertaken. A typical cost for a scheme for speed humps is in the region of £100 - £150,000.	
Pros	Cons
• Can be very effective in reducing vehicle speeds • Can be tailored to fit different road widths and conditions • Cycle-friendly • Bus and HGV-friendly • Better access for emergency service vehicles	• Can only be used in areas with a speed limit of 30mph or less • Must be illuminated to highway lighting standards • May cause discomfort to bus passengers and patients in ambulances if cushions cannot be straddled • Braking and acceleration noise plus vibration can make them unacceptable to residents • May not slow HGVs, wide wheel based cars or motorcyclists

CASE STUDY

TfB has installed speed cushions along Holtspur Top Lane, Beaconsfield in our effort to reduce vehicle speeds. Cushions can either be constructed using asphalt or can be pre-formed rubber and bolted down. In this instance, we used a bolt down option. The cost to supply and install 10 cushions was approximately £35,000. The process required a full public consultation which was generally supported by the majority.

4.1.7 On-street Parking Restrictions

In urban areas where there is high parking demand, parking management may be appropriate. Restrictions can be used to regulate the available parking space and designated parking spaces can be provided to specific user groups such as residents or for short-term parking. Parking bays can create natural chicanes of parked vehicles and ensure that parking is safe and appropriate.

Good parking management can also reduce conflict between pedestrians, vulnerable road users and drivers.

Where designated parking bays are provided, the road must be 5.5 metres or wider to ensure that emergency vehicles have access. It is beneficial in terms of speed reduction if the areas can be marked on alternate sides of the road as this creates the chicane effect.

Parking enforcement has become decriminalised and undertaken by Parking Services on behalf of BC and streets are patrolled on a regular basis. Whilst the Police Authority does have powers to enforce some elements of unlawful parking, this will only be for forms of obstructive parking. Parking restrictions require the implementation of a Traffic Regulation Order and before any parking restrictions can be installed, a formal public consultation will need to be undertaken.

Parking restrictions may be considered providing they do not create safety issues. This must also fit in with the policy, which is focused on implementing parking restrictions where there is a proven safety issue created by unregulated parking. Its effectiveness is dependent on the ability to enforce the restrictions and traffic flows. More information relating to parking can be found on the Council's website.

The parking guidance sets out Buckinghamshire Council's approach to parking throughout the County, ensuring developers provide the appropriate level and type of parking for new developments.

The Parking Delivery Plan (PDP) is an update to the Parking Implementation Plan produced in October 2017 and is designed to help shape, manage and deliver Buckinghamshire Council's Vision for Parking.

Typical Cost	
The typical cost for a installing a small parking scheme (double yellow lines junction protection) will cost approximately £8,000. For larger parking schemes such as controlled parking zones, these costs can exceed £100,000.	
Pros	Cons
• Relatively inexpensive to install, however there is an ongoing maintenance cost • Creates a natural traffic calming feature • Provides safe parking areas • Eliminates indiscriminate or obstructive parking	• The area must be visited on a regular basis to ensure that the restrictions are enforced • Enforcing the restrictions could result in additional costs • Locations will need to be monitored and reviewed on a regular basis

CASE STUDY

TfB recently delivered a scheme for parking restrictions within Gerrard's Cross, South Bucks which included the implementation of double yellow lines within various roads. The primary objective was to protect road junctions and aid the movement of traffic. This scheme included parking restrictions within five separate roads and the cost was approximately £12,000. The parking restrictions were subject to the outcome of a full public consultation.

In addition to this, time limited parking bays were installed to deter all day commuter parking and ensure a high turnover and usage of the parking spaces. The marked bays help motorists identify lawful parking areas and act as a traffic calming feature as vehicle slow down to pass parked cars.

4.1.8 Speed Limits

4.1.8.A 20mph Speed Limits and Zones

There is a significant difference between the characteristics of a 20mph speed limit and a 20mph zone.

20mph limits are areas where the speed limit has been reduced to 20mph but there are no physical measures to reduce vehicle speeds within the area. Drivers are alerted to the speed limit with 20mph speed limit repeater signs. 20mph limits are most appropriate for roads where average speeds are already low, and the DfT guidance suggests below 24mph. The layout and use of the road must also give the clear impression that a 20mph speed or below is the most appropriate.

20mph zones use traffic calming measures to reduce the adverse impact of motor vehicles on built up areas. The principle is that the traffic calming slows vehicles down to speeds below the limit, and in this way the zone becomes 'self-enforcing'. Speed humps, chicanes, road narrowing, planting and other measures can be introduced to both physically and visually reinforce the nature of the road. Traffic calming programmes can incorporate a wide range of measures designed to work in partnership to reduce speeds and improve the overall environment, and in effect this means there can be significant differences between schemes.

There are four main techniques to traffic calming programmes:

- Vertical deflections
- Horizontal deflections
- Road narrowing
- Central islands

20mph Zones will be considered on a case by case basis. This is because extensive traffic calming is needed to keep average speeds below 20mph. The Department for Transport would not normally recommend the introduction of a 20mph zone or limit on a village through-road. This is because the road would need to be extensively traffic calmed if speeds are not already on average below 20mph.

The DfT advice emphasises the need for caution when considering 20mph limits. Our experience suggests that signed-only limits have little or no effect on reducing speeds.

Further information, advice and guidance is in the DfT's Traffic Advisory Leaflet '20mph speed limits and zones' (09/99) and can be viewed at DfT.gov.uk.

Typical Cost	
The typical cost to implement a 20mph speed limit using signs and road markings only can range from £10,000 for a single road to £50,000 for an area wide speed limit. Similarly, 20mph Zones will be of a similar cost unless traffic calming features are required, which can increase costs up to £250,000.	
Pros	Cons
• Enhances 'safer routes to school' schemes and 'pedestrian zones' • Provides a lower posted speed limit for motorists to abide to	• Ineffective as a signs and lines only scheme • Likely to raise speed limit contraventions and complaints • Little or no enforcement by the Police Authority • Scheme costs can be significant if additional traffic calming measures are required

CASE STUDY

TfB delivered a scheme in 2014 to reduce the speed limit on Hedsor Road, Hedsor from 30mph to 20mph. This scheme was a Parish led scheme to reduce the speed limit in a residential area. A speed limit assessment was undertaken where before and after speeds were recorded. This scheme was a signs and lines only type of scheme. The results of the survey showed very little change in driver speeds, and this is due to the lack of any physical features forcing motorists to slow down.

A 20mph Zone was implemented in an area wide section of High Wycombe. This scheme included the use of traffic calming features such as speed humps, speed cushions, raised tables at junctions, build outs / narrowing's and parking restrictions. This was to aid reduced speeds and make the zone self-regulating.

4.1.8.B Advisory 20mph Speed Limits

Advisory 20mph speed limits are generally used outside schools.

Flashing lights are often used with school signs to make drivers aware that children could be in the road ahead. The lights normally flash at school opening and closing times - this increases the visibility of the school signs to drivers when children are most likely to be using the road.

In addition, the signs read "School/Patrol, 20 when lights show". This means a speed limit of 20 mph is advisory. Drivers are still permitted by law to drive above 20 mph, however the flashing signs advise 20 mph.

Typical Cost	
The typical cost to install an advisory 20mph speed limit outside a school will be in the region of £7,000 to £12,000 depending on the works required to get a power supply to the flashing light unit. The costs will include traffic signs, posts, flashing light unit on each approach to the school (assuming two approaches).	
Pros	Cons
• The flashing lights increase the visibility of the signs • Vehicles reducing their speed will improve road safety near the school • The school warning signs give drivers a good reason to slow down and take extra care • A relatively low cost option • Can be solar powered, which lowers installation costs	• The 20 mph speed limit is advisory only, and can be ignored • The school signs are warnings only, and some drivers may not change their behavior • The advisory speed limit signs could give some drivers the impression that speeds above 20 mph are advised when lights are off (which might not be safe) • The signs and lights could look intrusive or out of place in some rural areas

CASE STUDY

TfB recently delivered a scheme which involved new 'school 20mph when lights flash' sub-plate, repositioning of new flashing signs to a new height as well as new pole extensions to accommodate additional height of signs. There was also vegetation clearance to ensure visibility of new signs. This particular scheme assumed that the existing poles on site were adequate to house signs and not in need of replacement which saved money. This scheme took place on Bell Lane in Little Chalfont. The total cost of this project including all fees for management and staff was £1,837.02.

4.1.8.C Other Speed Limits

The Countywide speed limit review which concluded in 2012, has assessed the speed limit on all public roads in Buckinghamshire and installed new speed limits as appropriate in accordance with National guidelines. Any further requests for a speed limit change will need to be assessed on a case by case basis.

Speed limit signs and markings are governed by legislation. Terminal signs are provided at the start and finish of each speed limit. One terminal sign is normally required on each side of the road for each speed limit. These signs must be lit on 'A' roads when placed within 50 metres of a street lamp.

Repeater signs are smaller speed limit signs and must be provided at regular specified intervals along a road, except:

- in a 30mph speed limit with street lights (this is prohibited by the regulations)
- in 20mph zones
- on motorways
- on National speed limit roads without street lights

Speed limits can also be marked on the road surface at the start of each lower limit. By law, these roundels can only be placed alongside terminal or repeater signs and so cannot be used within 30mph street lit limits

Signed speed limits show the maximum legal speed and do not mean that it is safe to drive at this speed.

Typical Cost	
The typical cost to implement a speed limit change using signs and lines is approximately £12,000. Where repeater signs are required and the limit extends over a long length of road, the costs will increase.	
Pros	Cons
• Provides a lower posted speed limit for motorists to abide to • Contributes to a safer highway network for all road users • Can reduce the number of collisions	• Can be disregarded by motorists if the posted limit is imposed unduly and too low for the characteristic of the road • Can become expensive if street lighting is required to change a road to restricted road status • Police speed enforcement may be limited

CASE STUDY

In 2016, TfB introduced a 30mph speed limit through Stoke Mandeville. The speed limit was reduced from 40mph to encourage reduced vehicle speeds in a residential area. The cost to deliver this speed limit scheme was approximately £8,500 which included village entry signs.

4.1.9 Movement Traffic Restrictions

The council has powers to introduce requirements, restrictions and prohibitions on the movement of traffic in general or on specific types of vehicle. However, these restrictions can have knock on impacts on other parts of the network, as drivers divert and seek to take alternative routes. This needs to be carefully considered as part of any proposal that permanently restricts movements.

4.1.9.A One Way Streets

One-way traffic (or uni-directional traffic) is traffic that moves in a single direction. A one-way street is a street either facilitating only one-way traffic, or designed to direct vehicles to move in one direction. One-way streets typically result in higher traffic volume as drivers may avoid encountering oncoming traffic or turns through oncoming traffic. Residents may dislike one-way streets due to the circuitous route required to get to a specific destination and the potential for higher speeds which may affect pedestrian safety.

Typical Cost	
The typical cost for installing a one way street including consultation, signs, lines and electrical works is around £22,000. Should physical infrastructure works be required to reinforce the one way movement, then the costs can significantly increase.	
Pros	Cons
• Can ease traffic congestion and the movement of vehicles in narrow roads • Reduces the likelihood of conflict with oncoming traffic • Likely increase in available capacity on the road • Can reduce intersection conflicts for pedestrians and vehicles	• Can increase travel times to destination • Likely to increase vehicle speeds • The signs and lights could look intrusive or out of place in some rural areas • Can be an expensive scheme to deliver as all traffic signs need to be lit

CASE STUDY

TfB recently delivered a one-way road scheme on Addington Road in Buckingham. The scheme consisted of making Addington Road one way from a mid-point in the road; speed cushions were installed along the entire length of the road and kerb re-alignment works were completed at the southern junction with the A422. This was done to narrow the carriageway and provide a physical deterrent for the “no entry” signage at this location. Additionally a Traffic Regulation Order was created for the “no entry” road and 6 bollards were installed at the southern junction to prevent large vehicles from overrunning the footway and pedestrian crossing point. The total cost of this scheme including all fees came to £57,753.37.

4.1.9.B Weight and Width Limit Restrictions

Legal controls on vehicle weight or width apply to certain roads. Weight restrictions can be imposed for structural or environmental reasons to prevent large vehicles using inappropriate routes.

These restrictions should be used to:

- Reduce danger to pedestrians and other road users
- Prevent damage to buildings, roads and bridges
- Preserve the character, amenity and environment of an area
- Reduce and manage congestion on the roads

Weight restrictions are subject to a Traffic Regulation Order (TRO). Regulatory signs are displayed on the road to notify drivers and to help the police enforce restrictions. However, the police have limited resources to enforce this type of restriction (especially environmental restrictions).

Restrictions that allow access for deliveries or other reasons are extremely difficult to enforce and where possible physical measures should be installed to prevent abuse of the system. Where restrictions exist, the recommended alternative route should be signposted. Restrictions will not be used if there is no suitable alternative route.

TROs would only be implemented in the most extenuating circumstances as they are very time consuming to promote, can be costly and do not promise a positive outcome because of the difficulties in enforcement.

Typical Cost	
The typical cost for consultation and installation of signs only will be in the region of £8000. The scheme cost can significantly increase if installing physical infrastructure.	
Pros	Cons
• Can preserve the structural integrity of structures • Can reduce noise and other pollution in residential areas • Can improve traffic flows in local roads by concentrating HGV traffic onto a strategic route • Can improve quality of life and road safety in residential areas	• Difficult to enforce • May displace HGV traffic into surrounding villages • Can lead to lengthy alternative routes for HGV's • Can lead to a clutter of signs, particularly if diverting HGV traffic towards a particular route

CASE STUDY

TfB recently introduced a 7.5 tonne weight limit restriction in Walters Ash, Naphill. The restriction was imposed for environment reasons and was in relation to a new development in the area which would have seen an increase in HGV's potentially using local roads. The cost to deliver this scheme was approximately £8,500. This scheme consisted of installation of traffic signs only.

4.1.9.C No Right / Left / U Turn Restrictions

Legal controls on the turning movements of vehicles at junctions or intersections can be imposed for safety reasons and effective network management.

These restrictions should be used to:

- Reduce congestion by keeping vehicles moving opposed to stopping and waiting to turn at a junction
- Minimise the risk of collision by turning across a stream of oncoming vehicular traffic

Turning movement restrictions are subject to a Traffic Regulation Order (TRO). Regulatory signs are displayed on the road to notify drivers and to help the police enforce restrictions. Such restrictions can incorporate exemptions (such as no right turn except for buses) to allow better management of the highway network. However, the police have limited resources to enforce this type of restriction.

In most cases, and without an enforcement protocol, these types of restrictions can be ineffective when conveyed only by traffic signs. It is usually necessary to build in physical infrastructure to stop motorists from making the prohibited movements. This can significantly increase the project costs and can cause difficulty for emergency services via diverted routes.

TROs would only be implemented in the most extenuating circumstances as they are very time consuming to promote, can be costly and do not promise a positive outcome because of the difficulties in enforcement.

Typical Cost	
The typical cost for consultation and installation of signs only will be in the region of £8,000. The scheme cost can significantly increase if installing physical infrastructure.	
Pros	Cons
• Can ease traffic congestion and the movement of vehicles at junctions • Reduces the likelihood of conflict with oncoming traffic • Likely increase in available capacity on the road • Can reduce intersection conflicts for pedestrians and vehicles	• Can increase travel times to destination • Unlikely to be enforced routinely • Can lead to lengthy alternative routes • Can be an expensive scheme as some traffic signs may need to be lit

CASE STUDY

As part of a casualty reduction scheme, TfB has recently implemented a prohibition of right turn and u turn restriction on A412 Uxbridge Road and Black Park Road. The scheme involved installing and widening traffic islands to change the geometry of the road and physically prohibit the right turn movement. The cost of this entire scheme was in the region of £100,000.

4.1.9.D Prohibition of Motor Vehicles

A Traffic Regulation Order (TRO) allows the local authority to restrict, regulate or prevent the use of any named road. This includes footpaths, bridleways, and byways.

The Road Traffic Regulation Act 1984 says that local authorities must exercise their traffic regulation powers to secure the safe passage of all traffic, including walkers, horse riders, cyclists and motor and horse-drawn vehicles.

A TRO may be permanent, temporary or experimental, or may be imposed to allow the holding of a special event (a special event order).

The grounds for making a TRO are extensive:

- For avoiding danger to people or other traffic using the road, or preventing danger arising
- For preventing damage to the road or to any building on or near the road
- For facilitating the passage on the road or any other road of any class of traffic (including people on foot)
- For preventing the use of the road by vehicular traffic where that use is unsuitable bearing in mind the existing character of the road or adjoining property
- For preserving the character of the road in a case where it is especially suitable for use by walkers or horse riders
- For preserving or improving the amenities of the area through which the road runs
- For conserving and enhancing the natural beauty of an area, or affording better opportunities for the public to enjoy the amenities of the area, for recreation or nature study

Typical Cost	
The typical cost for consultation and installation of signs only will be in the region of £8,000. The scheme cost can significantly increase if installing physical infrastructure.	
Pros	Cons
• Can be used to segregate motorised and pedestrian traffic • Reduces the likelihood of conflict with oncoming traffic • Likely increase in available capacity on the road • Can reduce intersection conflicts for pedestrians and vehicles	• Unlikely to be enforced routinely and may require physical measures of control • Can lead to lengthy diversional routes • Can be detrimental to response times for emergency services

CASE STUDY

TfB delivered a prohibition of motor vehicles scheme on Roberts Lane in Chalfont St Peter. There had been concern in the surrounding community that the new HS2 haul road beside the M25 would cause traffic to divert and use Roberts Lane. The total price of this scheme was £30k which included a gate and TRO costs. Scheme costs can vary significantly depending on the measures which are put in place to prohibit vehicular traffic.

4.1.10 Controlled Crossings

Controlled crossings are a form of pedestrian crossing that gives priority to pedestrians or cyclists crossing a road. Controlled crossings should be contrasted with an uncontrolled crossing, which does not give priority to pedestrians, and which typically take the form of subtle road markings, sometimes combined with a central refuge.

4.1.10.A Zebra Crossings

A controlled pedestrian crossing, with black and white stripes on the road running across the pedestrian walking line. Belisha beacons accompany zebra crossings, on top of black and white striped posts, and flash yellow. Pedestrians have priority once they are on the crossing.

Zigzag markings (at most eight zigzags) must be provided on the approaches and exits of the crossing, to provide a 'controlled area' where waiting, loading and overtaking is prohibited. The number of zigzags can be reduced to two (but no less) where a local authority considers it necessary - but not to allow parking or loading near the crossing (which would reduce visibility).

Zebra crossings should only generally be used on roads with 30mph limits, or lower. Often, when zebra crossings are located outside schools, a crossing patrol officer may be deployed to assist vulnerable road users when using the crossing facility for the morning and afternoon peak of the school day.

Typical Cost	
The typical cost for the installation of a zebra crossing is approximately £80,000. The costs can increase if it is considered necessary to resurface the road to enable high friction surfacing to be installed upon the approach to the crossing. The high friction surfacing or high anti-skid surfacing material must be installed when introducing a new controlled crossing.	
Pros	Cons
• Pedestrians should only have to wait for a very short period of time to cross the road. • Typically cheaper than a signal controlled crossing • Can look more attractive than a traffic light crossing, which could be too obtrusive on smaller streets with narrow pavements • Low maintenance cost	• Vehicles do not always stop for waiting pedestrians • Blind or partially blind people find zebra crossings harder to use than traffic light crossings • A zebra crossing which includes a hump or narrowing of the road will require water drainage works, which could be very costly

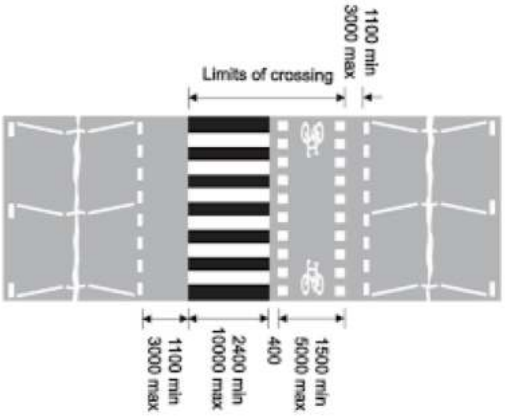
CASE STUDY

TfB recently installed a new zebra crossing on Buckingham Road, Winslow. The cost for the installation of the crossing was approximately £70,000 with a total project cost approximately £95,000. The project also included additional carriageway resurfacing, footway improvement works and additional drainage infrastructure.

4.1.10.B Parallel Crossings

Similar to a zebra crossing, but cycling is also permitted. These are relatively new and are now permitted to be installed within the revised regulations.

As this crossing is very new under Legislation, TfB have not yet installed this type of crossing. Below is an image of what a crossing may look like if implemented.



Typical Cost	
As these crossing are very new, TfB have not installed this type of crossing in Buckinghamshire. The anticipated costs are expected to be very similar to that of a zebra crossing at approximately £80,000.	
Pros	**Cons**
• Benefits as per a zebra crossing • Enables cyclists to safely cross a road • Typically wider crossing points and able to accommodate higher volumes of pedestrian traffic	• Can lead to conflict between pedestrians and cyclists on a single crossing point • Can lead to sudden braking of vehicles as cyclists may join the crossing suddenly

4.1.10.C Signal Controlled Crossings

A controlled crossing designed for the use of pedestrians, cyclists and equestrians to cross a road under a signal control. During a pedestrian crossing phase, motorists will be required by law to stop when a red light is shown. There are currently three different types of signal controlled crossings which can be installed.

Pelican crossings are no longer being introduced.

Puffin crossings designed for the use for pedestrians only to cross the road.

Toucan crossings are designed for both pedestrians and cyclists and are typically used adjacent to a cycle-path.

Pegasus crossings are similar to Toucan crossings but have a red/green horse symbol and higher mounted push buttons to allow horse riders to cross.

Typical Cost	
Typically the cost of traffic signal equipment is around £16,000, resurfacing is around £35,000 and civil works around £70,000 bring the complete cost for an installation in the region of £120,000.	
Pros	**Cons**
• Pedestrians given a clear signal when to cross • User friendly and safer for visually impaired • Can be programmed within the signal controller to accommodate a wider user group (i.e. cyclists, equestrians) • Vehicle users should never have to stop when nobody is using the crossing • Can help maintain vehicle traffic flow in busy pedestrian areas	• Signal controlled crossings are the most expensive crossing type • Expensive to maintain • Pedestrians must wait for the signal before crossing. It may take considerably less time to cross at a Zebra crossing • May be less attractive than other crossing types, which are less obtrusive in smaller streets

CASE STUDY

A scheme was recently delivered on the A41 at High Street Waddesdon, Aylesbury Vale. This scheme consisted of installing a signalised pedestrian crossing with carriageway widening and footpath resurfacing aspects. The works also included improvements to the drainage infrastructure and much vegetation clearance.

The cost of this scheme was £175,000.00 and was privately funded in conjunction with contributions from the Local Area Forum, New homes bonus (developer funding) and Capital Maintenance Team (resurfacing of carriageway).

4.1.11 Uncontrolled Crossings

Pedestrian crossings are provided to give people a safer place to cross the road. These crossing points are located at sites where there are high volumes of traffic and pedestrians.

The simplest type of pedestrian crossing is the uncontrolled crossing point, which may include dropped kerbs and tactile paving. If road widths permit, a central traffic island can also be installed, although this will significantly increase the typical cost shown below. These are generally used in areas where a formal (controlled) pedestrian crossing cannot be justified.

Drivers are not required to stop at an uncontrolled crossing point. The pedestrian must wait at the kerb until there is a suitable gap in traffic to allow them to cross and should only then cross with due care and attention.

Typical Cost	
Typically the cost to install one crossing point is around £6,000 which includes the provision of re-profiling the footway, making adjustments to kerbs, installation of tactile paving and re-grading any verges affected.	
Pros	Cons
• Allows pedestrians to cross more easily than if there was no crossing • The cheapest crossing design, in comparison to other crossings • Will be located in a position which is considered a safe point to cross the road	• There is no pedestrian priority. Motor vehicles have priority • Pedestrians may have to wait much longer for a gap in vehicle traffic to cross safely • For the pedestrian to cross safely, they must have good judgement of motor vehicle speeds and gaps in vehicle traffic • Visually impaired people may find it difficult to cross the road

CASE STUDY

We recently delivered a scheme in Flackwell Heath to install a total of 6 dropped kerb crossing points with tactile paving.

Two quotes were originally obtained for this scheme, one quote provided a cost for the construction of 6 individual crossing points so that the client could prioritise the locations based on the available budget, and the second quote received was the total cost for doing and guaranteeing all the 6 crossing points which ended up cheaper and is henceforth what we proceeded with. The total cost for this scheme came to £15,119.00.

4.1.12 Bollards

Bollards have a wide application on the highway. They can be used to convey information (such as a bollard on a traffic island advising motorists to keep left), restrict access to certain areas of the highway (preventing motorists from entering a pedestrian area) or be used to segregate footways and cycleways.

A variety of styles, sizes and functions are available on the market to blend into the landscape of the surrounding environment.

Typical Cost	
The typical cost for the supply and install of a rigid bollard commonly used on our highway network is approximately £500. Bollard types vary and range from as little as £250 to £2,000. Each site will be unique in its needs and prices will best assessed on individual requests.	
Pros	Cons
• Relatively inexpensive and easy to install • A variety of sizes and styles to blend within the surrounding environment • Can install removable bollards to enable access when required	• Can be considered visually intrusive • Can prevent access to certain areas for emergency services and maintenance vehicles • Can be prone to be hit and damaged • Can sometimes obscure visibility

CASE STUDY

TfB recently delivered a scheme on Upper Icknield Way which involved installing numerous bollards to improve the safety of pedestrian users. The scheme was located between the junction of Babington Road and Rowborough Road on both sides of the road; this was in the vicinity of the community combined school which experienced parking issues during peak times of the school. Cars during the peak times had been mounting the kerbs on either side of the road impacting the safety of the children and by installing the bollards, parking on the verge is now restricted creating a safe passage for all pedestrian users to and from the school. This can be seen in the pictures below. The total scheme cost was approximately £8,000.

4.1.13 Vehicle Activated Signs

Vehicle activated signs (VAS) are used to address speeding on roads where conventional signs are not effective. They do not replace conventional signs but are designed to be activated when approached by vehicles driving over the speed limit. Otherwise, the sign remains blank.

Two types of VAS are used on Buckinghamshire's road network. These are either a fixed or a moveable VAS.

Fixed VAS are permanent post-mounted signs and can display either the speed limit or a hazard warning. They must comply with The Traffic Signs Regulations and General Directions 2016 (TSRGD) and be approved

for use on the road. The TSRGD prescribes the signs and messages that can be displayed. Alternative messages are not permitted unless authorised by the Secretary of State. Normally, we provide only prescribed VAS.

Policy

VAS can be provided in three ways:

- TfB will provide, fund and maintain VAS where they are considered effective in reducing speed related collisions and casualties, and where no other cost-effective solution is appropriate.
- TfB will provide and maintain VAS but they will be funded by a third party. For example, where a local council or community believes VAS is necessary, but the site is not identified as a priority site. VAS may be installed if the casualty record is low but there is a proven problem with speed and other measures have been explored and ruled out. It may also be appropriate if existing measures have not worked.
- A third party provides, funds and maintains the VAS.

In all three cases, TfB will assess the suitability of the VAS including the location and type of VAS to be used, the power source and if applicable, the electrical supply and connection. Only approved suppliers and contractors will be used to carry out this work.

Effectiveness

A DfT study into the effectiveness of VAS at over 60 locations across the country showed that where collisions were recorded, these were reduced by up to a third and that average speeds were reduced by 4mph. There are various locations across Buckinghamshire where VAS has been provided resulting in similar collision reductions and average speed reductions of 2-3mph. Although the speed reductions may seem modest, VAS appears to be very effective at reducing the speed of faster drivers for a limited period of time.

Conditions suitable for VAS

When considering potential sites for VAS, we will consider a number of factors, including:

- Collision history
- Traffic speeds and condition of any existing signing and lining
- Whether other measures may be more suitable
- Whether a suitable location exists for the VAS
- If the site is in a conservation area or within the Chilterns AONB
- Whether there is local support

How to request VAS

To ensure local support, all requests for VAS should be made via the Parish or Town Council (or local Councillor in areas where no Parish or Town Council exists). The application of £455+VAT is used to assess current speeds at the site. If we already have up-to-date information, your application fee will be deducted from the cost of VAS.

Consultation

As the highway authority, the Council have the power to erect signs on the road and do not usually need to notify anyone living nearby. However, VAS are generally larger than conventional signs and therefore support of the local Councillor and anyone whose property is affected before installation should be sought.

Typical costs and timescales

VAS may be cheaper than other speed or collision-reducing features, but are expensive when compared to conventional signing. As well as the one-off supply and installation costs, there are ongoing costs for power, calibration and maintenance. Each VAS location will be different and likely costs and timescales will need to be prepared on a site-by- site basis. Typical costs and timescales are shown at the bottom of this page, but these are only guideline figures.

Maintenance

Most VAS suppliers will provide a guarantee against failure of between one and five years. This will not cover routine maintenance, vehicle impact or vandalism.

If we are responsible for maintenance, this will be carried out in line with our usual maintenance procedures and standards. Otherwise, maintenance contracts can be negotiated direct with the VAS supplier or other contractors.

Where to obtain a VAS from

There are a number of suppliers and contractors who can supply and/or install approved VAS on Buckinghamshire's roads. A list of preferred suppliers and installers can be found on our webpage:

https://www.buckscc.gov.uk/services/transport-and-roads/road-safety/managing-speed/vehicle-activated-signs-vas/

Where a third party provides, funds and maintains a VAS on a public road, only those suppliers and contractors listed in this document may be used.

Moveable Vehicle Activated Signs (MVAS)

MVAS initiative is a locally managed scheme where vehicle activated sign(s) can be purchased by the Parish/ Town Council and moved around the community to pre-agreed locations, co-fixed onto existing posts or onto a moveable post secured by a ground screw.

MVAS will be set to display the speed limit when approached by a vehicle travelling above a pre-determined speed (typically 33mph in a 30mph speed limit), acting as a reminder to drivers exceeding the speed limit. The aim of this is to encourage a safer driving speed and improve road safety.

Where can they be located?

MVAS should be located on the verge or back of a footway, where they can be seen easily by drivers in good time to adjust their speed accordingly. They should not obscure other highway signs or cause visibility issues to road users.

The signs can be fitted onto some existing posts, as long as there is sufficient room on that post to ensure

a minimum mounting height (where this applies). They could also be fitted onto Parish/Town Council owned lamp columns, although advice should be taken from your street lighting maintenance contractor to ensure that the structural stability of the column is not affected. Approval may be granted to fit them onto Buckinghamshire Council owned lighting columns, however this will be considered on a site by site basis.

The minimum mounting height for signs located on pedestrian routes or footways is 2.1m and 2.3m on a cycleway. In verges it should be mounted at approximately 1.5m – 1.8m above ground level.

There should be a minimum clearance of 0.5m between the edge of the carriageway and the sign to ensure that it is not struck by HGV wing mirrors.

In the event that an existing post is not available, a ground screw can be installed at several agreed locations which will allow a new moveable post to be fitted into it. This post will then be used to support the sign and can be moved around periodically. The post can be hinged if necessary, to allow the sign to be fitted onto the post easier.

Health & Safety

For each proposed MVAS location a suitable and sufficient risk assessment is to be carried out to identify the significant hazards and to determine the required control measures. Further details and a sample risk assessment can be found on the HSE website: http://www.hse.gov.uk/risk

Persons installing MVAS on posts or other street furniture must not use step ladders.

Any persons or organisation installing a MVAS must ensure that they have £5m public liability insurance cover.

How much will it cost?

Costs will vary depending mainly on how the scheme is managed, but will include the following:

- Equipment – sign, post, ground screws, battery, charger, memory cards
- Maintenance cost
- Speed data to measure effectiveness of scheme (if required) -
- £412+VAT per location
- Health & Safety equipment (see HSE website link for guidance) – Hi-vis vests should be used as a minimum
- Public Liability Insurance of £5m – this is an essential requirement, as instructed by Buckinghamshire Council's insurers
- Application fee - £455+VAT
- The applicants own staffing costs (where applicable)

Typical Cost	
The typical cost for the supply, installation & commissioning of a vehicle activated sign is approximately £6,000. It is also a requirement to contribute an additional fee for the future maintenance and upkeep of the sign. Options for solar or wind powered VAS are available. This infrastructure will be at an additional cost.	
Pros	**Cons**
• No discomfort or delay experienced by any vehicle user, in comparison to some other measures • Relatively cheap • Continue to have a positive effect over time • Can be installed where there is no electricity connection (using solar power and batteries)	• Not as effective as physical interventions which are 'vertical' • Too many vehicle-activated signs could diminish their effectiveness • VAS can be expensive to maintain • Some sites may not be suitable for solar/wind powered VAS

CASE STUDY

TfB recently delivered a scheme on Hillesden Road in Gawcott to install a new 30mph Vehicle Activated Sign. TfB worked alongside with Gawcott and Lenborough Parish Council; the parish council requested the quote for supply and installation of the VAS and TfB carried out the preconstruction paperwork, road space booking and site supervision. The Parish opted for a solar powered sign as the cost to provide an electricity supply was too expensive. The cost was approximately £6,500.

We also installed an electrical powered VAS on A413 Great Missenden bypass. The sign was installed as part of a network safety improvement scheme. The cost for the delivery of this element of the project was approximately £6,000.

Note: Costs for VAS can vary greatly depending on the options of the power source used to operate the device, the speed limit of the road (high speed roads require a passively safe post to be installed), whether the device is to be upgraded with traffic data logging capability and ultimately the required commuted sum for future maintenance and upkeep of the sign.

4.1.14 Other Measures

4.1.14.A School Travel Plans

- Schools can take action to:
  - reduce car journeys
  - increase other ways of getting to school
  - make journeys to and from school safer

Measures can include walking, cycling and public transport initiatives as well as engineering (crossing points for example) and education programmes.

To be successful, a school travel plan must be supported by the whole school community, including parents, teachers, students, governors and local people. We support schools by providing guidelines and reviewing completed plans to ensure they will be effective.

The DfT and DfES set a target for every school to have a school travel plan by 2010. Schools are encouraged to get involved and are supported by the Travel choice Team to try a variety of ways to reduce car journeys.

We have helped Buckinghamshire's schools reduce the number of children driven to school from 44 per cent in 1999 to less than 30 per cent currently, and the reduction is continuing.

Level 1	Level 2	Level 3
A school that is in the early stages of travel planning and is keen to address and resolve travel issues. It has contacted the Travel Choice Team and a recognised school travel initiative is in place.	A school that is developing a school travel plan. An STP coordinator has been identified and a representative working group has been set up. Research has been done and aims and objectives established (evidence of this must be provided) or a Level Three that has not been sustained.	A school that has an active school travel plan including all of the key elements detailed in the BC guidelines and Travel Choice website. In brief, these are: ● An identified STP coordinator and working group ● Detailed research - including usual and preferred modes of travel ● Signed terms of reference ● SMART targets ● Action plan ● Monitoring plans ● Adoption by the school's governing body and inclusion in the school development plan, or equivalent ● Commitment to providing an annual progress report of the STP to the Travel Planning Team ● Commitment to complete the BC Travel Planning Annual Hands-Up survey

4.1.14.B Feasibility Studies

A feasibility study is an analysis that takes all of a project's relevant factors into account—including economic, technical, legal, and scheduling considerations—to ascertain the likelihood of completing the project successfully. We use feasibility studies to discern the pros and cons of undertaking a project before investing a lot of time and money into it and determining the suitability of meeting its objective.

Design Process

Schemes are delivered through a series of key stages.

1. Concept Design – Ideas – normally written into Client Brief
2. Feasibility Design – Assessment of different options – identifies risks and provide robust budget estimate.
3. Preliminary Design
4. Detailed Design
5. Implementation

Feasibility stage is not independent to the delivery of the scheme, but an integral part of the design process. Without a feasibility stage to assess options, the further development and detailed design of the preferred option cannot take place.

More complex scheme may include all design stages and also involve consultation and decision processes within the stages. However simple schemes would not undergo the different stages. To help demonstrate this, a number of examples are shown below.

	Simple Scheme	Medium Scheme	Major Scheme
	e.g Dropped Kerb	e.g Controlled Pedestrian Crossing	e.g Major Junction realignment
1. Concept Design	Client Develops Brief		
2. Feasibility Design	N/A (Reviewed as part of detailed design)	Study undertaken to assess different options: - Assess and develop options - Justification of scheme - Identify key risks - Provide recommendation - Robust budget estimate for scheme budget (not quote)	
3. Preliminary Design	N/A	Not usually	Yes - develop
4. Detailed Design	- Undertake road safety audit - Produce construction information and - Obtain quotations		
5. Implementation	Construction		

5.0 Other considerations

5.1 Overview

Special consideration must be given to the nature of the road and its environment when selecting traffic calming measures. A range of options are available to suit rural, urban or residential areas.

A great deal of debate has arisen from public transport operators and their passengers about the suitability of horizontal or vertical techniques. Complaints, especially about some of the physical traffic calming features, have been made. Humps and bumps can hinder access and response times for emergency vehicles and affect patient comfort. HGVs and commercial vehicle operators are also affected.

In rural areas, the needs of large agricultural vehicles should also be taken into account.

5.2 Public Utilities

If work requires the ground to be broken, utility companies must be consulted for plans that show any cables or pipelines in the area. This is a legal requirement. If equipment belonging to utility companies will be affected, the traffic calming scheme must be changed, or the utility equipment moved. The cost must be met by those paying for installation of the traffic calming measure which may make the scheme costs prohibitive.

5.3 Safety Audit

Road Safety audits may be required on some schemes, and should be carried out at set stages during the design process as an independent assessment of potential road safety problems associated with a scheme.

Problems identified and recommendations as a result of such an audit may affect the cost of a scheme or its feasibility.

5.4 Review Process

Completed schemes should be reviewed to ensure they are successful in reducing speeds and/or collisions. Environmental impacts such as congestion, noise, light and pollution should also be noted.

5.5 Legislation Affecting Speed Limit Signs and Markings

Speed limit signs and markings are governed by legislation. Terminal signs are provided at the start and finish of each speed limit. One terminal sign is normally required on each side of the road for each speed limit. These signs must be lit on A roads when placed within 50 metres of a street lamp (see section 4.1.8.C for further information).

6.0 Other Strategies

6.1 Overview

The Council's Local Transport Plan (LTP) is the main strategy for transport in Buckinghamshire. It includes 20-year vision (to 2036) for transport. The LTP also sets out what is to be achieved each year, and individual strategies for various local areas.

The LTP can be viewed on the Council's website via the following URL. There are also links to other related strategies.

https://www.buckinghamshire.gov.uk/parking-roads-and-transport/policies/

6.2 HGV Routing

The current expectation is that HGVs should use roads that are most suitable for their size. These are usually the highest graded A, B and C roads, strategic inter-urban roads and other primary routes for through traffic. The nature of the key routes through Buckinghamshire makes HGV routes almost self-selecting.

HGV traffic at pickup, access and delivery points can put significant pressure on other parts of the road network.

Accessible and appropriate information, particularly from satellite navigation systems and clear signs can help to direct and encourage HGV traffic along the most suitable routes.

6.3 Freight Quality Partnership

A Freight Quality Partnership (FQP) with hauliers, business representatives and other stakeholders will be considered as part of the Freight Strategy. An FQP can help to improve the efficiency and lessen the impact of freight on Buckinghamshire's residents and roads.

The Council has a duty to maintain the roads under the Highways Act. We carry out regular inspections to ensure the roads remain in a safe condition.

7.0 Public Realm Works

We carry out work often in partnership with Parish Council's and other stakeholders which we call Public Realm and Environmental Improvement schemes. The aim of these schemes is to improve public areas whether this is in neighbourhoods, along major roads or in town and city centres in order to create more attractive and safer public areas.

Working with communities to improve areas of perceived weakness is not just seen as valuable work to improve the sense of place i.e. making people feel good when they make use of the areas whether that is to visit, shop, work or live there but it also helps promote healthier, safer and cleaner areas of public space meaning that more people will want make use of the space. This often has a knock on benefit for local businesses and communities with businesses will be more likely to invest money, to build or to trade there, which improves the economy, creates jobs and acts as a seed for further investment and improvement.

The Council aims to work with communities and stake holders to improve public spaces, provide a better pedestrian landscape, promote new opportunities for economic growth and make changes to traffic circulation often changing the modes of travel to walking and cycling in key areas away from motor vehicles.

It is important that communities and the Council work together to realise improvement goals, and to that extent the Council encourages communities to look at a creative and place making approach to projects and are encouraged to explore innovation and the use of alternative materials. By working in partnership with the Council, projects can be refined taking into account project aims, maintenance liabilities and budgets in order that a successful scheme is the result.

Through innovation it is hoped that communities can move away from standard 20 mph zones, bolt on solutions of traffic calming i.e. speed cushions and embrace more attractive solutions which still achieve the same aims but also have wider benefits of place making.

Some examples of public realm improvements currently discussed with communities include:

- Narrowing carriageway and widening footways through creation of shared spaces, kerb buildouts etc.
- Providing seating and planting within the highway to change the character of a road in order to tackle perceived speed concerns
- Different surface materials on the carriageway and footways (e.g. in-print) to help encourage lower speeds
- Incorporating footway crossings and raised tables into designs (giving perceived priority over car users)
- The use of Sustainable Urban Drainage into traffic calming schemes (pocket gardens)

7.1 Aston Clinton case study

With significant levels of development in and around Aston Clinton, the Parish Council wanted to ensure that their community saw some benefit coming from all the new homes. Through their work leading up to their Neighbourhood Plan, there was an acknowledgement that the highway environment was not conducive to village life, issues of speeding, rat running, general high levels of traffic were issues raised regularly at community forums and meetings. There was a fear that new housing would further compound these issues. The Parish sought the advice from a Highway Consultant as to what might be possible within their Parish to help reduce the impact of new development; a detailed comprehensive mitigation package was the result. Acknowledging that the highway proposals were strongly supported by local residents through their work on the Neighbourhood Plan and working with the Parish, the former Buckinghamshire

County Council agreed to take forward the Parish Council's proposals and utilise the document to secure S106 funding from new housing development in the Parish to help fund the mitigation proposals. Overtime, a substantial funding pot has been established and obligations have been placed where appropriate on developers to provide key items of infrastructure supported by the community. Work is currently being done by Transport for Buckinghamshire in partnership with the Parish on detailed design for many of the measures originally outlined. Through partnership working, it is hoped that Aston Clinton's vision of reduced occurrences of speeding, lower levels of traffic and general congestion will be realised.

The scheme being considered for Aston Clinton is separated into five zones which extend along Aston Clinton Road (from the roundabout joining the A41), Aylesbury Road, London Road and Tring Hill (to the roundabout joining the B4009).

A number of features are being considered which include the use of different surface materials, coloured surfacing, priority road narrowing's, village entrance gateway features, speed limit changes, raised tables, enhanced crossing facilities for pedestrians and changes to the road geometry, alongside other features.

The estimated cost to deliver these features and carry out these improvements exceeds £1 million. It is anticipated that the installation of these features will lead to a safer environment for all road users, provide a visual enhancement and change in character to the locality and encourage sustainable forms of transport.

An example of how different materials used for carriageways and footways can give the sense of a shared space.

An example of how a raised junction table could look and encourage reduced vehicles speeds at intersections.

An example of how segregation of cycle lanes and the use of coloured road surfacing can encourage sustainable forms of transport.

8.0 Review

This traffic calming guide takes into consideration the latest National guidance on traffic calming which can be viewed in full at DfT.gov.uk.

This guide will be reviewed periodically to take account of best practice, changes to DfT policy, and feedback from Parish Councils and will also be updated in line with new policies and procedures implemented by the Council.

All indicative prices reflected in this booklet will remain unchanged upon minor amendments of the booklet, and will only be fully reviewed upon a comprehensive update of the booklet. All costs should be considered indicative and accurate at the time of implementing the scheme. Costs to deliver a similar scheme today may be significantly higher than those shown within the examples and cost estimates / quotations will need to be provided for your chosen scheme.

Transport for Buckinghamshire

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