

Traffic Advisory Leaflet 14/99 December 1999



Traffic calming on major roads: a traffic calming scheme at Costessey, Norfolk

Introduction

This leaflet summarises the impact of a traffic calming scheme on two roads in Costessey, Norfolk. Although the roads in question are minor roads they carry a relatively high number of HGVs serving as access to a local gravel pit. The design of the traffic calming measures used could, therefore, have application on major roads. Monitoring was carried out by the Transport Research Laboratory (TRL), on behalf of the Charging and Local Transport Division of the Department of Environment, Transport and the Regions. Installation of the measures was completed in July 1997.

Full details of the scheme and the monitoring undertaken are contained in TRL Report 364.



Background

The Village Speed Control Working Group (VISP) study (see Traffic Advisory Leaflet 1/94) concluded that, whilst simple traffic calming measures might offer an interim solution, schemes would need to be comprehensive if large reductions of speeds in villages on major roads were to be achieved. As a follow up to the VISP study, the Department commissioned TRL to monitor and report on more comprehensive schemes installed in villages on major roads, particularly trunk roads. The overall aim of the project was to see whether 85th percentile speeds of vehicles could be reduced to no more than the actual speed limit through villages.

The scheme

The two roads forming the scheme in Costessey were West End and Longwater Lane. Prior to implementation these roads were subject to a speed limit of 30 mph. The mean two-way traffic flow was 5000 - 6000 vehicles per day. HGVs formed 10% of this traffic flow, rising to around 20% in the early morning. Based on radar speed measurements, before implementation 85th percentile speeds of light vehicles were 36mph - 38mph, and for heavy vehicles were 32mph to 35mph. Before mean speeds were 32mph -34mph for light vehicles and 28mph - 30mph for heavy vehicles.



Longwater Lane entrance

The purpose of the scheme was to reduce mean speeds towards 20 mph and stem further increases in traffic flow through the village.

A 20mph zone was introduced along part of West End and Longwater Lane. To encourage the 30mph speed limit to be observed in Longwater Lane, on approach to the 20mph zone, a vehicle actuated fibre-optic 30mph sign was installed. This was located 625m in advance of the 20mph zone. The sign was specially authorised by the Road Safety Division of the Department on behalf of the Secretary of State.



Speed cushions - West End

At the Longwater Lane and West End (west) entries to the zone the carriageway was narrowed to 3.5m using a single buildout, with priority being given to outbound traffic. A speed cushion was also installed within each of the narrowings. The West End (east) entry comprises 20mph zone signs, and is located between a new miniroundabout (outside the zone) and a pair of speed cushions (within the zone).



West End entrance

21 pairs of speed cushions were installed within the zone, 18 of the pairs being located on West End. A spacing of between 60m to 80m was adopted to encourage constant vehicle speeds. The cushions have a height of 75mm, an overall length of 3.5m and an overall width of 1.5m. On and off ramps have gradients of 1:8, and side ramps have gradients of 1:4. Transverse spacing between cushions varies between 750mm and 1200mm depending on the overall width of the carriageway. The buff surfacing, formed from calcined bauxite, extends beyond the width of the cushions to give them a wider appearance. The dimensions were chosen to reduce the likelihood of increased vehicle noise from the HGVs.



Mini-roundabout at West End/ The Street junction

Narrowings formed from build outs on both sides of the carriageway, resulting in single lane working, were installed at two locations on West End and one on Longwater Lane. These provided convenient locations for pedestrians to cross and incorporated dropped kerbs.

A flat top hump, with rounded ramps to assist the passage of buses, was installed outside the local school. The hump was 75mm high with a nominal ramp gradient of 1:13. The plateau and ramps were surfaced in reddish-grey concrete block paving of different sizes to give a random pattern effect.



West End flat top hump outside school

Results

Flows: On Longwater Lane, flows increased by about 9% with little change on West End. Longer term monitoring (15 months after implementation) showed flows on West End had increased by 6% over the before flows and on Longwater Lane by 20%. Much of this was likely to have been due to the recent opening of a superstore in the area.



West End - narrowing

Speeds: Mean and 85th percentile speeds are on average 7 mph - 9 mph below before speeds through the zone, and 10 mph - 11 mph below at the zone entries.

Actual mean speeds are around 25 mph, though around the school they are at or below 20 mph. Actual 85th percentile speeds are 30 mph to 33 mph, but are about 25 mph near the school.



Longwater Lane -narrowing

In the trigger zone of the 30mph vehicle actuated sign, the 85th percentile speed of inbound vehicles showed a 5-mph reduction when compared to speeds before installation. However, the speed was still 7mph above the 30mph speed limit. This result is probably influenced by a downhill and open approach to the village on this section of Longwater Lane.

Vehicle and traffic noise

Vehicle noise: Measurement of vehicle noise (noise of individual vehicles) was taken at a speed cushion location and at a between cushion location before and after installation. This also enabled a comparison to be made between vehicle noise at the cushion and a level surface. The maximum light vehicle noise levels were reduced at both sites after installation of the cushions. Noise reductions of 3.8 dB(A) at the cushion and 4.1 dB(A) at the level surface were obtained. For heavy vehicles, reductions in mean vehicle noise of 2.7 dB(A) at the cushions and 1.6 dB(A) at the level surface were indicated.



West End - flat top hump outside school

Traffic noise: Changes in traffic noise exposure were monitored outside residential properties adjacent to a speed cushion location and alongside a road narrowing, before and after installation. The noise instrumentation was configured to record the number of individual noise events exceeding a selected high noise level threshold in each hour as well as the maximum noise levels in each hour.

At both sites the hourly noise levels were consistently lower throughout the daytime period after installation of the measures. Reductions obtained were 3.7 dB(A) at the cushion site and 4.7 dB(A) at the narrowing. Night-time noise levels were down by 2.6 dB(A) at the cushion site and 1.9 dB(A) at the narrowing.



Longwater Lane - speed cushion

In terms of maximum noise there was no consistent increase or decrease in maximum hourly noise level when comparing the before and after installation situation for both the cushions and the narrowings during the hours of 5:00 to 19:00.

For the high noise level events, the results show that fewer noisy events occurred in the after period.



Vehicle activated speed limit reminder sign in Longwater Lane

Public opinion surveys: 100 residents were interviewed for the before survey. Where possible the same residents or a close neighbour was interviewed in the after survey. Almost half the respondents were over 60. The percentage of females was 55 in the before survey and 59 in the after survey.

After the scheme installation fewer people claimed to walk to the shops or to visit friends, and more claimed to use their cars. However, the overall effect of the scheme is not entirely clear.

Before the traffic calming was installed most respondents thought it was a good idea, but after installation it was considered unsatisfactory by the majority. Whilst fewer were bothered by speeding traffic after the scheme was installed, bother from the total amount of traffic was unchanged and nuisance from traffic congestion increased. Table 1 provides a summary of respondents views on traffic nuisance.



Queuing at Longwater Lane entrance

It is thought that the concerns about congestion may have resulted from vehicles having to give way to opposing traffic at the narrowings, or because of queues formed by some vehicles passing slowly over the cushions. Overall, there was a perceived improvement in safety.

Noise levels perceived by the residents changed little between the before and after situations, even though measurements showed noise levels had been reduced. This may be due to the change of character of the noise patterns as a result of the introduction of the speed cushions.



West End - speed cushion

The main concerns about measures installed were about the speed cushions, which respondents felt were ineffective in slowing traffic, and the 20 mph zone signs, which respondents considered drivers did not respect.

| Table 1: Cause of nuisance from traffic | | |
|---|---|-------|
| | Percentage of residents bothered 'very much' or 'quite a lot' | |
| | Before | After |
| Speeding traffic | 85 | 72 |
| Amount of traffic | 86 | 86 |
| Danger in crossing | 72 | 71 |
| Danger to children | 89 | 80 |
| Traffic congestion | 59 | 72 |
| Lorries | 76 | 63 |
| Parking problems | 37 | 39 |
| Rat running | 90 | 81 |
| Poor driving | 57 | 55 |

Accidents

Insufficient time has elapsed since the scheme was completed for analysis of any changes. During the five years before installation there were 15 injury accidents, of which six occurred on Longwater Lane. Five of the accidents were reported during the 3 years prior to installation. In the 2 years since installation (up to June 1999) 3 injury accidents had been reported.

Conclusions

The scheme has achieved reduction in speeds, though not in traffic flows. Indeed, flows have increased, probably as a result of new development that has taken place in the vicinity. The scheme has shown that even where the percentage of heavy vehicles is high, overall traffic noise can be reduced using speed cushions placed at regular and relatively closely spaced intervals. However, it does cast further doubt on the efficacy of using speed cushions to achieve speeds of 20mph or less, as only outside the school where a full width road hump was installed were speeds as low as 20mph achieved. The success of any scheme will, to a large extent, be judged on the acceptability of the scheme to residents. Surveys carried out at other traffic calming schemes have shown that residents do have difficulty in judging actual traffic speeds and do not always appear to appreciate that speed reductions have been achieved. However, greater dissatisfaction with schemes has usually been expressed in locations where 20mph speed limits have been installed but mean speeds of 20mph or less have not been achieved.

Acknowledgements

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References

TRL Report 364 - A Traffic Calming Scheme at Costessey, Norfolk

TA Leaflet 9/99 - 20 mph Speed Limits and Zones

TA Leaflet 1/98 - Speed Cushion Schemes

TA Leaflet 8/96 - Road Humps and Ground-borne Vibrations

TA Leaflet 6/96 - Traffic Calming: Traffic and Vehicle Noise TA Leaflet

4/94, Speed Cushions

TA Leaflet 1/94, VISP - A Summary

TRL Project Report 85 - Speed Reduction in 24 Villages: Details from the VISP Study

Highways (Road Humps) Regulations 1999 (SI 1999/1025)

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