Consulting

Borough Green
Traffic Management Options

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A25 & A227 Route Study

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1 Introduction

Traffic speeds on the main routes through Borough Green (BG) have long been regarded by local residents as too high and consistently above the signed speed limit giving rise to safety concerns. The police share this view yet enforcement of the speed limit by policing alone is not practicable or seen as the proper means to control speed.

Whilst some speed reduction measures such as vehicle activated signs and speed cameras have been installed at specific locations, their effectiveness appears to be fast diminishing. With little prospect of traffic volumes decreasing in the long term on what are strategic routes in the area, particularly the A25, local District Councillors, the BG Parish Council (BGPC) along with local residents have continually campaigned for further, more effective, measures to address what they consider to be on going traffic problems on the A25 & A227 through BG, mainly speed related.

In recognition of these concerns Kent County Council (KCC) have agreed with BGPC to jointly fund a route study of the A25 & A227 through BG to investigate options for traffic management measures aimed primarily at speed reduction, including the possibility of implementing 20mph speed limits.

This report details the findings of this study, including recommendations to be taken forward for further consultation. The report also identifies where other safety improvements might be needed, recommending appropriate solutions as appropriate.

The study routes are shown on Drawing number 4300244/01 provided in Appendix A. The routes includes the length of the A25 from the Nepicar Sand Quarry in the east to the Dark Hill roundabout in the west, and the length of the A227 from south of its crossing over the M26 to its junction with the A25.

2 Existing Conditions

2.1 Road Environment and its impact

The appearance of the road environment and its use will influence a driver's perception of what speeds are appropriate. With both the A25 and A227 through Borough Green and Platt evidently experiencing traffic speeds in excess of the signed limit, either the right speed limit has not been set, or better driver information is needed to emphasis the road environment to support the signed speed limit.

This study focuses on the latter and does not set out to review the 30mph speed limit in force through Borough Green, other than consideration of where 20mph speed limits might be more suitable. Speed limits on the outskirts of Borough Green are however reviewed latter on in this report.

To better understand and observe how the existing road environment and it's features may be influencing a driver's assessment of what speed is considered acceptable, several site visits where undertaken comprising a drive through and walk through survey. The observations noted are described below.

2.1.1 A25 - Site Survey Observations

Overall, vehicle speeds were judged to be travelling at speeds consistently above 30mph, typically around 35 to 40mph throughout the route including those sections through the more build up areas although to a lesser degree. This was not just confined to car users with the majority of heavy goods vehicles also observed travelling at similar speeds.

Lined generally with residential properties throughout, many of which are set back and out of view, and with very little pedestrian activity other than at the junction with High Street, potential conflicts are limited. This is likely to be key to a driver's assessment of what speed is safe and acceptable to be travelling at. The absence of any effective speed enforcement measures (i.e cameras) is also evident

A further general observation is that vehicle speeds tend not to be influenced to any large extent by differing road standards (i.e road width). Some sections appear narrow yet opposing traffic flows, particularly lorries, did not notably adjust their speeds even though passing very close to each other.

A more detailed record of the observations noted is given below.

A25 – travelling east to west

From the Nepicar Sand Quarry entrance to the change in speed limit (40mph/30mph) at St Mary's Platt, the road is characterised by its curved alignment consisting of fairly sharp back to back left and right hand bends passing beneath the rail bridge. These bends tend to limit speeds to a maximum of 40mph. Crash data over the last 5 year period (see section 2.3) has revealed that one incident has occurred on this bend where a loss of control may have been a contributory factor.

The change in speed limit to 30mph is not ideally located as it is at the end of a bend and slightly obscured by overgrown vegetation (see Photograph No. 1). The dragon's teeth markings provide greater emphasis although in poor/wet conditions these markings can be less visible.

Evidently, its impact on speed reduction is minimal even though its meaning is obvious to drivers. It was noted that the carriageway red treatment area was badly worn, lessoning its conspicuousness. This type of arrangement is typical throughout Kent and its location, although not ideal, generally appears appropriate in terms of the slight change in road character with buildings becoming more visible from the roadside as you enter past the signs.

Photograph No.1 – Driver's view of 30/40 speed limit change (westbound)

Approaching St Mary's Platt Primary school the effectiveness of a dilapidated small central refuge island, presumably intended as a traffic calming feature, is questionable and perhaps presents more of a hazard judging by its condition (see Photograph No.2.).

At the school itself a vehicle activated sign displaying '30mph' when activated is clearly proving ineffective, with virtually every vehicle passing activating the sign (See background in Photograph No.2 and Photograph No.3). It was noted that no similar sign was provided on the eastbound approach to the school yet speeds appeared similar.

Photograph No.2 – Dilapidated island and activation of VAS (background)

Photograph No.3 – Activation of VAS

From the school to the junction with Long Mill Lane, approximately 400m, the road standard is generally good with intermittent frontage development and low pedestrian activity (See Photograph No.4). There appears little here to induce drivers to travel at 30mph or less.

Photograph No.4 – Good standard of road and intermittent frontage development

Immediately to the east of Long Hill Lane is a signal controlled pedestrian crossing (Puffin) recently installed as part of Section 278 works associated with the Memorial Hall Development. Use of the crossing is currently very low and with a commencement date for the development unknown, and unlikely to be for some time, its continued low use can give rise to safety concerns. Drivers who become accustomed to not being stopped at the crossing can begin to ignore their existence.

Furthermore, the permanent green signal does little to encourage drivers to approach with care.

Photograph No.5 – Recently installed signal controlled pedestrian crossing (Puffin)

From the junction at Long Hill Lane to the junction with Crouch Lane, a distance of some 700m, a continuous central hatched marking, generally 1.2m in width, provides a visual narrowing of lane widths presumably aimed to encouraging lower vehicle speeds (See Photograph No.6).

A recent speed survey undertaken at this location (see Section 2.2.1) revealed that speeds of 35 to 40mph were typically recorded including regular occurrences of 50mph. This suggests that the enhanced central markings are doing little to encourage any speed reduction and conceivable could be providing drivers with a greater sense of security through increased separation, possibly resulting with an increase in speed, although this cannot be confirmed.

Properties are also well set back and screened from the road by trees and hedges creating an open and uncomplicated environment again with minimal pedestrian activity.

Vehicle speeds are probably higher over this length than any other section through Borough Green. Even the presence of a vehicle activated sign positioned mid-point is having no apparent effect on speed reduction.

Photo No.6 – Central hatched marking

West of Crouch Lane the road passes through the more urbanised section of Borough Green with more visible frontage development and increased pedestrian activity although essentially concentrated at the High Street junction where the main retail and commercial premises are present. Typical scenes of the road environment are shown in Photographs 7 & 8 and the High Street junction in Photograph 9.

Traffic speeds are perhaps slightly lower here compared to areas east of Crouch Lane. From site observations, speeds appear to be at or just above the 30mph for the most part.

Photo No.7 – Approach to High Street junction (westbound)

Photo No. 8 – North of junction with High Street (westbound)

Photograph No.9 – A25 junction with High Street

Where the A227 joins the A25 some 200m east of the High Street junction, a new min roundabout is to be constructed as part of the proposed development on land previously occupied in part by the Red Lion public house. Details of the mini roundabout can be found in Section 3.2.1.

The new junction, when completed, will clearly impact on traffic movement in the vicinity resulting in significant traffic calming as well as signifying a change in road environment for eastbound traffic.

Located approximately 100m to the west of the proposed min roundabout is the existing change in speed limit from 30mph to the national speed limit (See Photographs No.10 & 11). Its layout is again typical relying on non-physical measures to slow traffic down when entering the 30mph limit.

Photos No.10 (looking west) & 11(looking east) – Speed limit change 30mph/national speed limit

There is a distinct change in the road environment at this point although it is noted that frontage properties continue for some 70m beyond the 30mph limit on the northern side. Speed reductions are evident when entering the 30mph are although perhaps not to 30mph. It is also noted that one of the speed limit signs is currently obscured by overgrown vegetation although despite this the change in the speed limit remains fairly clear.

Beyond the speed limit change to the Dark Hill roundabout, a distance of approximately 400m, the road is characterised by continuous, slightly imposing, hedgerows and trees creating an enclosed environment with vehicle speeds typically observed to be travelling around 40-50mph. There is also no accesses or frontage development present.

2.1.2 A227 – Site Survey Observations (heading southbound)

From south of the M26 bridge crossing to the Borough Green Landfill site access, a distance of around 0.5km, the road environment is generally open with buildings/establishments setback from the road with mix use comprising two schools, several recreational sites, residential and commercial premises.

The road is fairly straight with minimal pedestrian activity throughout the day, save as the school during start/finish times, and as a result lends itself to experience higher traffic speeds than that currently signposted (i.e. 30mph). Photographs 12 & 13 are typical of the road scene.

Photos 12 & 13 – Typical road scene, M26 crossing to BG landfill site.

Drivers entering the area are initially confronted with the speed limit 'gateway' arrangement comprising a central splitter island and signage (see photograph 14) and do so with minimal 'discomfort' as there is no meaningful narrowing of the carriageway or other pronounced features.

Photograph 14 – 40mph/30mph 'Gateway' south of M26 bridge crossing

Furthermore, with the two schools located just beyond the 'gateway' being effectively out of view, drivers have no real increased hazard awareness. Speeds are therefore essentially unaffected and appear generally to continue above 30mph through and beyond the gateway.

Immediately south of the change in speed limit are the entrances to the two schools; Grange Park & Wrotham schools. Throughout the day the area is generally low key except for school pick up times where traffic is seen to queue back from the first school entrance, extending beyond the central island where the speed limit change occurs (see Photograph No.15). Evidently, the school car park has insufficient spaces and queuing/parking on the road appears to have become the accepted way.

Photograph No.15 – Queue forming back from the school entrance with gap left at Central Island

Whilst this is perhaps a typical scene at most schools, there are some particular safety issues observed in this case:

- Some drivers may be tempted to pass the wrong side of the central traffic island (see Photograph 15) at a point where forward visibility is limited due to the slight left hand curvature of the road ahead of them
- Parked cars effective reduce the carriageway width to single file working causing some hesitation by drivers
- There is no warning, or expectation for many, of a potential queue ahead when approaching from the north over the M26 bridge
- Cars emerging from the school entrance have their visibility severely restricted to the right by the queue of stationary cars, not help by the left hand curvature of the road (see Photograph No.16). It was observed that a member of school staff was standing in the middle of the road directing traffic because of the poor visibility, which is a concern.
- Vehicles approaching the schools on the A227 from the south were not notably moderating their speed during this busy and slightly chaotic period, perhaps not helped by the near constant green signal at the crossing

- When the crossing was activated by pupils, several were seen to run to the crossing as the signals were about to change

The crossing itself was well observed in terms of its use. No pupils were seen to cross away from the crossing point, aided by the guardrails.

Photograph No.16 – Queuing vehicles restricting visibility to the right from the school entrance

South of the BG Landfill site drivers encounter a sharp bend (see photographs 17 & 18) before entering the main build up area. The bend has a slight effect on constraining speeds and it is noted that a repeater '30mph' roundel marking mid-way through the bend is provided, although badly worn. Of particular note is the layout and appearance of the carriageway that does not change as it enters the more built up area (see photograph 19) and therefore does little to encourage drivers to slow down.

Photograph 17 & 18 – sharp bend at BG landfill site, s/b and n/b respectively

Photograph 19 – View entering into built up area

From this point on, southwards to the junction with Fairfield Gate, a further 350m, utility works in the carriageway were in progress at the time of the site visit. The road character over this stretch is very similar to that shown in photograph 19 and, as such, many drivers are probably exceeding the speed limit to some degree. A permanent speed camera is located within this section and the increasing number of tickets issued may support this view.

Continuing southwards from the Fairview Gate junction, over the rail crossing and to the junction with the A25, the road character has a town centre feel with increased pedestrian and vehicular activity associated with the rail station, the High Street, several retail premises, on-street parking and off-street public car parking (see Photograph Nos. 20, 21 & 22). There is also a near 90 degree bend in the road (see Photo 20) and two zebra crossings.

Photograph No.20 – View looking south, High Street in background

Photograph No.21 – View looking west showing on-street parking/retail premises/crossing

Photograph No. 22 – Access to public parking area

With the heightened activity and increased physical constraints, drivers are moderating their speeds in this area; however there are certain notable features that need to be addressed from a road safety viewpoint:

- A series of intermittent on-street parking bay lengths exist along the southern side of the road between the junctions of High Street and the A25 (see Photograph No.23), a distance of approximately 250m. Spaces are believed to be occupied generally throughout the day and night resulting with insufficient width to allow two-way traffic.

Photograph No 23 – looking west, On-street parking

Drivers on the side of the on-street parking were seen, on occasion, to accelerate hard to 'jump' between the gaps in the bays rather than wait for oncoming traffic to pass. This is creating a sense of unpredictability and uncertainty that ultimately should not continue.

- The On-street parking as noted above is also obscuring visibility to the left for drivers exiting the public car park access road as shown in Photograph No.24. Drivers turning left are effectively pulling out 'blind' to then be confronted with oncoming vehicles. Some local residents who were nearby during the site visit commented that on several occasions parked vehicles had been damaged as a result of 'near misses' with oncoming traffic.

Photograph No.24 – Parked vehicles obscuring visibility

- On approach to the rail crossing when travelling northbound the markings of the zebra crossing located to the north of the bridge are obscured by the brow in the road alignment (See photograph No.25). Additionally, the poles and beacons are not sufficiently prominent in the foreground due to a cluttered and busy background.

  Drivers new to the area may not appreciate the presence of the crossing with little time to react should they need to stop.

  Photograph No.25 – Inconspicuous Zebra crossing

Safety improvements to address the above concerns are discussed in Section 3.5

2.2 Traffic Conditions

2.2.1 Speed Surveys

Full details of an Automatic Traffic Count Survey (ATC) carried out by KCC between Monday 24th February and Sunday 2nd March 2014 to the east of Brockway on the A25 in Borough Green are provided in Appendix B.

The results of the survey show that some 65% of drivers exceeded the 30mph speed limit the majority of which were travelling at speeds between 30mph and 35mph. 85%ile speeds lie around 36mph which means 15% of drivers exceed this speed.

A small but regular percentage of drivers (1 to 2%) were recorded travelling at speeds around 50mph suggesting that under free flowing conditions the road environment and its physical characteristics allow certain drivers to assess that such speeds are safe and acceptable.

Nationally, it is reported [1] that 46% of car drivers exceed 30mph speed limits and 16% will exceed 35mph. Comparatively, this suggests that the A25 through Borough Green has a higher than expected proportion of drivers who are exceeding the speed limit. This may be a reflection on the strategic importance of the A25 where a significant proportion of traffic is through traffic unable to access alternative routes due to the M25/M26 effectively bypassing the area and with limited access.

[1] Department of Transport Free Flow Vehicle Speeds in Great Britain:2013 data tables

A speed survey carried out in 2009 on the A227 Wrotham Road indicated that the fixed camera site to the north of the junction with 'The Avenue' was proving to be effective at preventing speeding (around 90% of driver were travelling under 30mph at this point and over 99% under 35mph). However, the Kent and Medway Safety Camera Partnership data for the number of tickets that have been issued since 2009 shows a rapid increase from 227 tickets in 2010 to 1434 in 2012. This indicates that the camera may not now be as effective as previously considered.

Currently there is no further data for the rest of the A227 to confirm whether drivers are generally compliant with the speed limit although as suggested in section 2.1.2 above, speed levels observed to the north of the Borough Green landfill site access appear to be frequently in excess of 30mph.

2.2.2 Traffic Flow and Composition

Results of automatic traffic counts recorded in 2013 at three Department of Transport sites are summarised in Table 1.

Table 1

ATC Site Location	AADT (2-Way)	HGVs (%)	Cyclists (%)
A25 west of A25/A227 junction	17,577	3.7%	0.2%
A25 east of A25/A227 junction	12,395	4.5%	0.09%
A227	8,341	5%	0.2%

The KCC speed survey in 2014 to the east of the A25/A227 junction gave very similar results and indicated a near 50/50 split between eastbound and westbound traffic flow with peak hourly flows of 900 vehicles (w/b) and 800 vehicles (e/b) recorded.

Based on the traffic flow levels given in Table 1, the A25 to the west of its junction with the A227 is approaching road capacity during peak periods and around 70% capacity east of the A227. High traffic flow levels such as this will tend to cause a reduction in speed and it is noted that corresponding reduction in traffic speeds were recorded in peak periods during the 2014 speed survey.

Heavy goods vehicles count for around 4-5% of the traffic and this is generally typical for the class of road. It is however noted that the Nepicar Sand Quarry site (A25) and the Borough Green landfill site (A227) generate regular HGV trips throughout the day.

2.3 Accident Statistics

Personal Injury (PI) crash data for the 5 years to 31st March 2014 has been obtained and assessed for both the A25 and A227 within the study area. Full details of the data are provided in Appendix C comprising 'D-Print Crash Reports' and location/severity plot plans.

Table 2 provides a summary of the PI crash data over the five year period which is briefly discussed below.

Table 2 - Summary of PI accident data (severity/period)

	04/09 – 03/10			04/10 – 03/11			04/11 – 03/12			04/12 – 03/13			04/13 – 03/14		
	Slight	Ser	Fatal	Slight	Ser	Fatal	Slight	Ser	Fatal	Slight	Ser	Fatal	Slight	Ser	Fatal
A25	4	-	-	1	1	-	5	1	-	5	2	-	3	1	-
A227	1	-	-	1	-	-	1	1	-	-	-	-	-	1	-

A25 –Dark Hill roundabout to A20 London Road

There are 23 recorded crashes; 18 slight and 5 serious (casualty severity)

- 7 (30%) of the crashes involved pedestrians (4 slight and 3 serious)
- 3 (13%) of the crashes involved cyclists (all slight)
- 6 (26%) of the crashes involved motorcycles (5 slight and 1 serious)

The crashes appear to fall into the following broad categories:-

- Lack of attention – in 12 (52%) of the crashes (8 due to vehicle, 4 due to pedestrian)
- Poor decision making – in 9 (39%) of the crashes (8 due to vehicle, 1 due pedestrian)
- Highway condition - 1 crash (motorcyclist)
- Lost control - 1 crash

Generally the weather was fine and the road surface dry in 18 of the crashes and wet in 5 of the crashes. 16 of the crashes occurred during daylight and 7 in darkness (6 with street lights present).

The crash plot plan shows that generally crashes are scattered along the route with no predominant cluster site. Clusters of three crashes have been recorded at three junctions over the 5 year period however this is not unusual as most accidents occur at junctions.

Compared to national statistics, incidents of crashes resulting in a serious casualty severity are higher than average and also incidents involving pedestrians. However, this is only a small sample.

Excessive speed could conceivably have been a contributory factor in in the level of severity of 8 crashes however this cannot be confirmed. None of the pedestrian crashes occurred on any of the formal crossings and perhaps most notable is the number of crashes involving motorcyclists.

A227 – between A25 and M26

There are 5 recorded crashes; 3 slight and 2 serious.

- 3 (60 %) of the crashes involved pedestrians (2 slight, 1 serious)
- 1 crash is a single vehicle incident where the driver lost control (sharp bend near landfill access)
- 3 of the crashes have occurred in the vicinity of the schools, 2 involving pedestrians (1 serious, 1 slight). 1 of these occurred just after school finished and appears to have taken place on the pedestrian crossing (Signal controlled))

In all crashes the weather was fine and road surface dry. Only 1 crash occurred in darkness (no street lights). A lack of attention (either by pedestrians or drivers) appears to be a factor in all crashes. Excessive speed is likely to have been a contributory factor in only one of the crashes.

It is noted that the speed camera on the A227 was installed in March 2004 and that, as previously mentioned, the number of speeding tickets being issued is increasing.

3 Traffic Management Options (Speed Reduction)

3.1 General Approach/Objectives

It is important to be clear on the purpose of any traffic management options and assign priorities that, in overall terms, will provide the correct balance between mobility, road safety and local issues. Consultation with all affected parties will play a major role in this respect to ensure a properly informed decision is arrived at. Therefore, whilst the proposals presented in this report are believed to offer a well-balanced and effective solution, they are subject to representations through consultation forums and as such should be seen initially as a basis for further discussion.

Three general objectives were set:-

i. To identify and develop a combination of appropriate speed reduction measures (physical or non-physical) to encourage compliance with the signed speed limits

ii. To assess if 20mph limits or zones might be appropriate in certain areas on safety grounds

iii. To assess if the speed limits set along the outer fringes of Borough Green and St Marys Platt are suitable

In assessing both the A25 and A227 sections there are notable differences in road environment and overall use and for that reason each section is discussed separately below.

3.2 A25 – Nepicar Sand Quarry to Dark Hill Roundabout

Setting the road apart from other roads outside the Borough Green area can play an important part in influencing driver behaviour. Currently, whist the road environment has several distinct changes along the route; the road itself through Borough Green has not. It is seen as a continuous single carriageway with no unusual features or distinct identity. As a result, drivers will tend to have no real conscious or subconscious reaction when entering the area with little or change in their driving style or attitude.

For any traffic calming scheme to be really effective, it is important to create a sense of real change. A technique that has been shown to contribute to speed reduction, and one that appears to have strong potential in this case, is the removal of the centre line white marking. This tends to increase driver uncertainty encouraging drivers to voluntary adopt slower speeds due to an enhanced perceived danger.

Site observations have suggested that HGV drivers, in particular, are placing a degree of reliance on the centre line marking to 'confirm' their safety with speed levels remaining unchanged when passing very close to opposing traffic.

With several stretches of the road having minimal pedestrian or other non-motorised presence, there is little to 'distract' drivers or draw their attention to peripheral activities that would otherwise induce speed reduction.

Removal of the centre line marking is likely to have its greatest impact in these situations and is recommended to be taken forward as a general 'blanket' measure to be used throughout the route. This will provide a consistent message to drivers who will clearly recognise the change in road scene and should associate the change with a need to change their driving habits, particularly related to speed throughout the Borough Green area.

In areas where the removal of centre line markings is proposed, carriageway edge lines would also be recommended. These will serve to provide guidance in poor weather conditions (mist/fog etc) and may even induce further speed reductions due to the perceived road narrowing that they provide. Furthermore, removing the centre line markings may give rise to concerns over the tendency for drivers to drive closer to the kerb line as a result, which is clearly not desirable. The edge lines should serve to prevent this occurring.

It is however unlikely that removal of the centre line marking alone will fully address the speed concerns and meet the specific objectives as set out below. At some locations they should even be retained in order to provide essential guidance (i.e. at main junctions). Additional traffic calming measures have therefore been considered the basis of which has been determined on the following factors:

- The A25 is a primary route with a high level of through traffic with no obvious competing route available, particularly with limited connectivity to the M26 motorway.
- Traffic volumes are high, in the range 13400 to 17400 vehicles per day, and will remain so even with speed reduction measures in place
- There is a balanced vehicle flow (50/50 in each direction)
- Traffic speeds of 50mph or greater were repeatedly recorded (1-2%)
- The majority of drivers do not excessively exceed the 30mph with around 90% < 40 mph
- Frontage development is primarily residential with many dwellings set back and screened from the road by hedges and trees, although this is more prominent to the east of the junction with Crouch Lane (approximately 2/3rds of the route)
- To the west of Crouch Lane the road environment is generally more enclosed with buildings/boundary walls lining the road over long stretches
- Road standards vary ranging in width from 6.5m to 8.2m
- Pedestrian activity is generally low with only notable concentrations at the junction with High Street where the main retail establishments are found
- One school (Platt Primary school) is located adjacent to the A25
- A mix of controlled crossing facilities are provided (i.e. Zebra and Pelican crossings)
- Accidents have involved pedestrians, although not at controlled crossings, but overall are scattered along the road with no predominant cluster sites

Taking the above into account, and noting site observations, it is considered that reducing the overall mean speed of drivers by 5mph where mean speeds lie in the range 30mph to 40mph should be targeted. In addition, specific measures are to be considered to reduce the speed of the fastest drivers (i.e. 50mph) and additional measures at the school as these should bring significant safety benefits.

A 5mph reduction in mean speed in the range 30mph to 40mph can have a significant impact on the frequency and severity of road accidents. Research[2] has suggested that a 5% reduction in accident frequency per 1mile/h reduction in mean speed could be expected. This equates to a 25% reduction in accident frequency for a 5mph reduction in mean speed.

In achieving such reductions in speed it is felt that vertical deflection measures (i.e road humps/speed cushions etc.) would be inappropriate and too severe leading to excessive speed reduction. As a strategic route, and given the concerns normally expressed by the emergency services and bus operators, vertical deflection by any means will almost certainly be viewed unfavourably.

Measures proposed comprise both physical and non-physical forms including gateway 'pinch points', chicanes, surface treatments, cycle lanes and enhanced surface treatments at pedestrian crossings and other potential conflict areas, all of which are discussed in turn below.

Details of the range of measures proposed along the route are shown on drawing number 4300244/02 with the specific details of particular treatments shown on drawing numbers 4300244/03 to 05 inclusive.

The assessment of the suitability of permanent 20mph limits/zones is discussed separately in section 3.2.2.

3.2.1 Specific Traffic Calming Measures (speed reduction) – 30mph speed limit

The proposed measures are described in a westerly direction commencing at the change in speed limit down to 30mph at the east end of St Marys Platt. Unless otherwise stated, the centre line marking can be assumed to be removed and replaced with carriageway edge lines

30mph/40mph gateway

The existing gateway arrangement is not sited particularly well being at the end of a bend and obscured by vegetation when approaching from the east. It is also lacking any real distinctiveness that in turn does little to encourage any speed reduction. In an area where speed reduction is particularly needed, being on the approach to Platt primary school, a radical change to the arrangement is perhaps warranted to better alert and encourage drivers to slow down.

One solution commonly used in these situations is the introduction of a 'pinch point' gateway effect. A suggested layout is shown on Drawingnumber 4300244/03. The arrangement shown replaces both the existing gateway and the small central separation island.

Sited some 30m westwards away from the bend, visibility of the gateway will be much improved. The provision of narrow nearside build-outs (400mm wide) with bollards installed along their lengths for improved prominence will create a small but physical narrowing of the road aimed at increasing a driver's awareness of the change in speed limit.

To safely accommodate the passing of large vehicles a 6.5m road width is proposed. Whilst the narrowing would appear minimal, its combined affect with the start of the removal of the centre line marking will be very visible to the driver and create a greater sense of change that currently does not exist.

Dragon's teeth markings on the approach to the gateway are unlikely to provide any real additional impact on speed reduction. They are often seen as unsightly and out of keeping with the local environment and as such have not been included.

[2] TRL Report 421 The effects of drivers' speed on the frequency of road accidents

Approaches to Platt C of E primary school

The school suffers from limited and difficult parking arrangements and as a result some parents/guardians picking up and dropping of children were seen to either mount the footway on the opposite side of the school or momentarily stop in the carriageway if the opportunity arose.

This occurs over a very short period of some 15 minutes, as observed between 3:15 & 3:30 in the afternoon. It is assumed that the morning period is no different. Photograph 26 shows the typical scene during these periods.

Photograph 26 – Children leaving school (Platt C of E Primary School)

The footway width outside the school is not particularly wide, approximately 1.8m (see Photograph No. 3 in Section 2). This creates an intimidating environment for pedestrians when on the footway as drivers are not seen to react to the increased roadside activity by reducing their speed. Despite this however, there has not been any injury accidents reported over the last 5 years outside or in the vicinity of the school.

Whilst there are plans to relocate the school, which is currently undergoing a planning process, it is likely to be some time before relocation occurs, if at all. In recognition of this, and that there appears to be a need to temporary highlight to drivers the increased activity and potential danger during school in and out times, advisory part-time 20mph limit signs with flashing school warning lights, as shown in Figure 1 are recommended. These can be used to replace the existing 30mph vehicle activated sign which is proving ineffective. One nearside sign on each approach should be provided.

Outside of school start and end times a permanent 20mph speed limit is considered inappropriate, particularly given the A25 is a main through road with very low pedestrian activity (See Section 3.2.2 for detailed 20mph review).

The advisory signs should operate only for short durations (15mins) when children are visible, making them much more effective. These signs do not require special authorisation from the Secretary of State and they can be introduced by the local authority where they are considered appropriate.

Figure 1 - Existing Central Traffic Island (Grange Road Junction)

The existing central island to the west of Grange Road acts as a pedestrian refuge for a formal uncontrolled crossing point and also offers a degree of protection for drivers waiting to turn right into Grange Road (See Photograph No.27).

Photograph No.27 – Existing central refuge Island

The islands presence is clearly beneficial however in keeping with the removal of centre line markings and the potential benefits this may offer in speed reduction, it is proposed to keep the longitudinal tapered markings on the leading side of approaches to the island but remove all other markings. This will remove the short but narrow and tapering central lane currently marked for traffic turning right into Grange Road (See Photograph No.27).

The central lane width is however sub-standard and does not adequately provide a safe refuge for turning traffic as it may be giving the impression to approaching drivers that vehicles waiting to turn right can be safely passed at speed, which in many cases they can't.

With the lane removed, drivers waiting to turn right are likely to position themselves more 'generously' within the carriageway and cause approaching drivers to become more aware and slow down to be sure that a safe passage ahead of them is available.

Existing Signal Controlled Crossing (Puffin) – West of 'The Ferns' Junction

The signal controlled pedestrian crossing was installed as part of Section 278 improvement works associated with the Memorial Hall development proposed on the north side of the A25. With an uncertain timeframe, it may be sometime before the development proceeds resulting with the signal controlled crossing remaining significantly underused. Its continued underuse presents safety concerns and does little to encourage speed reduction.

When pedestrian flows are relatively low, and if speed conditions are appropriate, zebra crossings can be advantageous over signal crossings both in terms of traffic calming and accident prevention. When approaching a zebra crossing, drivers' subconsciously become more aware of their surroundings and tend to moderate their speed as they have the obligation to stop should a pedestrian be present and waiting to cross. When approaching traffic signals, a driver's attention tends to focus on the signals, hoping they won't change, and maybe speeding up and consequently being unaware of any pedestrian presence. This is perhaps borne out by the latest accident statistics[3] where pedestrian casualties reported on and within 50m of a zebra crossing are effectively half that compared to signalised crossings.

It is however important to note that zebra crossings should not be installed on roads with an 85%ile speed of 35m.p.h or above for safety reasons.

Accordingly, providing speeds can be shown to remain at this level, conversion of the crossing to a zebra crossing is recommended in conjunction with a red surface treatment across the entire carriageway width on the approaches for improved conspicuousness.

Recent developments in equipment design for zebra crossings have significantly enhanced their conspicuousness with the use of LED beacon lighting and supplementary lighting within the beacon columns. Lighting effects such as visible halos means crossings can easily been seen in all light conditions without the nuisance of night-time light pollution.

If and when the development proceeds then a signal controlled crossing may become more appropriate, particularly should relocation of the Platt C of E primary school go ahead. For that reason the existing signal underground infrastructure should remain in place.

As a minimum, even if traffic calming measures are not implemented, it may be prudent to temporarily switch of the signals (bag over) and allow its use, albeit only in the short term, as an uncontrolled facility on safety grounds.

Minsters Orchard to Crouch Lane (0.5km)

There is a marked change in road character over this length with a wider road section and buildings set well back and generally screened from the road by hedges and trees. It has a suburban feel and with little pedestrian activity creates an environment with little perceived hazards.

This view is perhaps confirmed with vehicle speeds repeatedly recorded in excess of 50mph (2014 speed survey). A variable message sign located mid-way through this section, displaying 30mph when activated, is believed to be having little impact on speed reduction. Physical traffic calming appears to be the only realistic self-enforcing option that would have a real impact on preventing high speeds of this level.

[3] DfT – Reported Road Casualties Great Britain:2013 – Annual Report

With a wider road section available the opportunity exists to install 'gateway' type two-way chicane arrangements at either end using build-outs to provide deflection with lanes separated by road markings. Suggested layouts are shown on drawing numbers 4300244/04 & 05 which include provision for cyclists as discussed below.

Whilst the chicanes should slow fast traffic they are unlikely to result with an overall speed reduction through this section as only limited deflection is possible because of the need to maintain two-way traffic flow. Between the chicanes additional measures are therefore likely to be necessary to reduce overall speeds on this wide section of carriageway.

An option often used with wider carriageway sections in urban areas, and one that should be considered here, is to introduce nearside cycle lanes, advisory or permanent. As well as providing safety benefits for cyclists they also provide a visual element aimed to better alert drivers of the potential for cyclists in the road. They also make the road appear narrower which can help towards speed reduction. It is noted that one accident resulting in injury to a cyclist was recorded on this section in the last 5 years, the cause of which was a driver passing to close to the cyclist, perhaps not helped by the presence of the central hatched markings.

The merits of introducing cycle lanes would need careful consideration as they would be isolated from any other cycle provisions and be limited in width to between 0.8m and 1m. Their provision for traffic calming purposes alone is generally not recommended as it is possible that their inclusion may create more conflict.

An alternative measures might be to consider provision of a series of central physical islands between the chicane arrangements, although these have been shown to have limited impact on speed reduction. They can also create unwanted pinch points for cyclists which can be hazardous.

As a minimum it is felt that the central hatched markings should be removed as they do not fit well within an urban environment and visually may be creating sense of increased security through greater separation of opposing flow. Drivers may, consequently, feel at ease to drive faster. A centre line marking should however be provided in this case due to the much wider carriageway. Although lane widths would be wider than normal, such wide lanes are generally found only in urban areas and may as a result better contribute to speed reduction compared to the hatched marking. Wide lanes also afford greater space for drivers to pass cyclists.

Crouch Lane to High Street

West of Crouch Lane the road begins to narrow with frontage development becoming more prominent. Pedestrian activity however remains relatively low although the presence of the zebra crossing to the west of Crouch Lane is seen to have a good traffic calming influence, despite its low usage.

The crossing should be retained with its conspicuousness improved through use of colour contrasting surfacing (red) on the approaches and improved lighting equipment (i.e LED). When set against a minimal background (i.e no centre line markings) these measures should add further to its traffic calming effect.

Other than removal of the centre line marking no other speed reduction measures are deemed necessary over this length.

High Street & Quarry Hill Road junctions

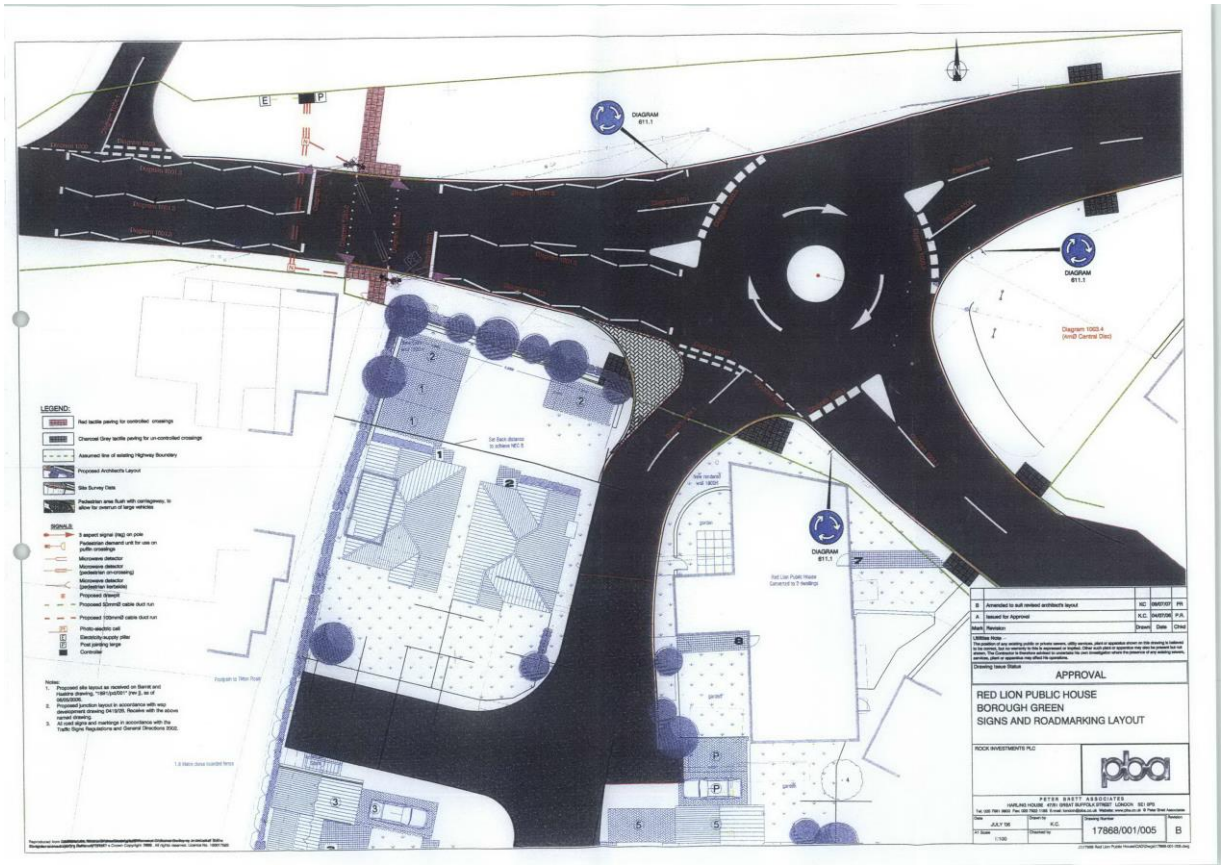
With a heightened level of activity at these closely spaced junctions including regular use of the nearby pelican crossing and frequent turning movements there is an element of speed self-enforcement.

As a result, the need for traffic calming measures are probably unwarranted and unnecessary although it may be beneficial to apply a colour contrasting surface treatment to the whole junction area, similar to that suggested in other areas, that would highlight the increased potential for conflict. Central road markings should however be retained in this instance as there is a need to provide guidance for drivers to correctly position themselves when waiting to turn.

There have been three personnel injury accidents over the last 5 years at the junction involving turning vehicles. One solution considered was provision of a mini-roundabout arrangement as this would both address the turning accidents and offer an effective traffic calming measure. Outline designs have shown that use of the forecourt to the commercial premises on the northwest side of the High Street junction would be needed to accommodate a realigned kerb line. Whilst it is probably unrealistic to expect any agreement to loss of forecourt space, it remains an option to be investigated should other measures prove inadequate.

A227 Western Road Junction

Approximately 200m to the west of the High Street junction, where the A227 joins the A25, the junction is to be altered to a 'four armed' mini roundabout as part of the Red Lion Public House redevelopment to the south of the junction. Details of the proposed layout are shown below[4]



Whilst this will clearly act as a speed reduction feature it is noted that no speed reduction measures have been proposed on the approaches. Such measures are normally recommended when the 85%ile dry weather approach speed is 35mph and above within 70m of the junction.

[4] Stage 1 Safety Audit – July 2006 Peter brett associates

Approach speeds on the A227 are unlikely to be in excess of 35mph due to its curved approach and the influence of nearby on-street parking, particularly should safety improvement measures be implemented as suggested in section 3.5. It is perhaps not so clear for the A25 approaches.

The proposals show that on the eastbound approach the existing pedestrian signal controlled crossing is to be retained. This is a concern due to its low and infrequent use by pedestrians that is unlikely to change even with the development in place. As previously discussed, conversion to a zebra crossing may be more suitable given its improved traffic calming influence and improved road safety attributes.

Signal control crossings when sited in close proximity to roundabouts can also present risks to drivers who may misinterpret the green aspect as meaning it is safe to continue and enter the roundabout. A zebra crossing will remove this risk, a risk that initially might be heightened due to driver complacency as they may not initially fully appreciate the presence of a new roundabout.

If a zebra crossing were to be implemented then, as before, it would be important to ensure approach speeds are kept to 35mph or below. Again, removing the centre line marking on the approach should assist in reducing speeds but this would need to be carefully monitored.

Should approach speeds exceed 35mph then additional traffic calming features would be necessary, or alternatively, reverting back to a signal controlled crossing. It would therefore be prudent to retain the existing signal infrastructure (i.e. ducting/sockets/controller etc).

30mph/National Speed limit gateway

There is a distinct and sudden change in the road environment where the speed limit changes from the national speed limit down to 30mph. This is seen to moderate traffic speeds to a degree although further speed reduction is felt necessary, particularly at the commencement of the 30mph limit.

With limited road width available, any 'pinch point' narrowing techniques similar to that proposed at the eastern gateway is not possible. It is therefore suggested to retain the existing gateway arrangement but enhance its appearance with a colour surface treatment (red). Section 3.4 also promotes the suggestion to introduce a short transitional speed limit change (40mph) to replace the existing 60mph limit to better regulate a driver's speed on the approach to the 30mph limit.

3.2.2 Suitability of 20mph speed limits

Borough Green Parish Council has expressed a desire for the introduction of 20 mph speed limits over two sections along the A25:

1. A25 - from the start of the current 30 mph speed limit in St Mary's Platt (east of Ingleborough Lane) to the junction of Long Mill Lane (a distance of around 600 metres)
2. A25 - from the vicinity of the junction with Crouch Lane to the existing 30 mph / national speed limit gateway west of the junction with A227 Western Road (a distance of approximately 775 metres)

Appendix E contains a report that details the assessment undertaken for the suitability of such limits for these sections in line with Department for Transport Circular 01/2013 – Setting Local Speed Limits.

The main findings for both sections are that a permanent 20 mph speed limit is not appropriate, due to the major strategic and through traffic function of the road. However, within Section 1 a 20 mph advisory part-time speed limit should however be considered for Platt C of E Primary School, to operate for an appropriate time period in the morning and afternoon.

3.3 A227 – South of M26 to Junction with A25

The same speed reduction principles proposed for the A25 can also be applied to the A227 namely; removal of centre line marking, enhanced surface treatments in areas of potential conflict (i.e. crossings) and other specific measures, physical or non-physical, at particular locations where additional traffic calming is warranted.

Speed reduction by means of vertical deflection (humps etc.) is again undesirable as the route continues to fulfil a strategic function for through traffic although not to the same extent as the A25. That said, where traffic speeds are already low, particularly around the rail station and High Street areas, then vertical deflection can be better tolerated and may prove more effective. Section 3.5 identifies where safety improvements may be required in these areas and suggests the use of vertical deflection methods.

Similar to the A25, it is considered that a general reduction in mean speed of 5mph should be targeted where mean speeds are considered to be greater than the observed speed limit (30mph). Where speeds are generally compliant with the speed limit no speed reduction measures have been considered.

Details of the range of measures proposed along the route are shown on drawing number 4300244/02

The assessment of the suitability of permanent 20mph limits/zones is discussed separately in section 3.2.2.

3.3.1 A227 – Specific Traffic Calming Measures (Speed Reduction) – 30mph speed limit

Grange Park and Wrotham Schools

With the two schools effectively detached from the built up area of Borough Green, and with a small number of residential properties situated opposite the schools, there is perhaps the potential and desire to create a distinct 'village' type feel to the area as you approach and travel through it, which currently it does not have. That said, other than during school opening and closing times, the area is fairly uneventful with little pedestrian or other non-motorised activity.

key safety concerns do however centre around the schools during the short periods when pupils are going to, or coming from the school premises and it is these that must be addressed and improved through traffic management measures. With that in mind the following specific additional measures are proposed, and briefly discussed below:

i) Enhanced 30mph/40mph Gateway 'pinch point' arrangement

ii) Conversion of the signal controlled crossing to a zebra crossing including provision of coloured surface treatment

iii) Advisory part-time 20mph limit signs with flashing school warning signs

The proposed 'pinch point' gateway, similar to that detailed on Drawing number 4300244/03, will provide a more effective physical narrowing of the road compared to the current arrangement which is disjointed and does little to induce speed reduction or provide a real sense of change in the road environment. Photograph No.28 shows the southbound approach to the gateway which is open, rural in appearance and, as a result, approach speeds can be expected to be relatively high. Furthermore, the presence of any schools in the vicinity is evidently absent, reinforcing the need for an improved speed reduction feature.

Photograph No.28 – Approach to speed limit gateway

As observed during the school pick up time, the area becomes very busy and a little chaotic which is not helped by the central traffic island at the existing speed limit gateway. The island causes a degree of confusion to some drivers when they are confronted with the queue formed back from the school entrance (see Photograph No.29). The 'pinch point' arrangement will remove this island

Photograph No. 29 – Queue forming back from school resulting in 'confusion' at island

Currently, the existing signal controlled crossing shown in the background in Photograph No.30 provides the safest form of at-grade crossing facility because of the speed of traffic which, for the most part, exceeds 35mph on the approaches.

Photograph No.30 – Existing signal controlled pedestrian crossing

With use of the crossing effectively limited to very short periods related to school activities there is a strong case to consider converting the crossing to a zebra crossing for reasons previously stated in this report, providing traffic speeds can be reduce to levels below 35mph (85%ile). A colour surface treatment on the approaches would also be beneficial to improve the crossing's conspicuousness.

It is noted that a pedestrian casualty occurred on this crossing where the pedestrian appeared to simply walk out into the path of a vehicle without looking. This is unlikely to be the case with a zebra crossing.

In recognition of the number of safety concerns during school opening and closing times it is clear that greater emphasis is required on speed reduction. For that reason the use of advisory part-time 20mph limit signs with flashing school warning lights should be installed provided.. Both nearside and offside installations should be provided on the northern approach, as the nearside one might be obscured by queueing traffic, and one on the nearside for the southern approach.

Entry/exit into main built up area of Borough Green (south of Landfill site)

A form of entry treatment is suggested at the southern end of the sharp bend into the built up area at the location shown in Photograph No.19. This will provide a visual message to drivers that they are entering an area of different character where greater conflict with non-motorised users could be expected, and speeds should be reduced.

As an example, the entry treatment can take the form of a coloured surface treatment over a distance of 10m with closely spaced bollards near to the kerbside edge on either side to provide a sense of road narrowing.

On the bend itself, centre line markings should be retained for guidance but beyond the entry treatment, and also north of the bend, removed.

Southern section through Borough Green to junction with A25

Continuing south on the A227, over the rail bridge and through to the junction with the A25 no specific traffic calming measures are considered necessary other than the removal of the centre line marking. However, from Fairfield Gate southwards, just north of the rail crossing, the centre line markings should be retained for guidance due to the many side streets and access points present.

The permanent camera site located just to the north of 'The Avenue' should remain as this will continue to have some impact on speed reduction, or be it much localised and perhaps less effective than previous years as the records would suggest.

Further south, near the Station entrance and the High Street areas, and beyond, vehicle speeds are generally low with sharp bends, zebra crossings and on-street parking all adding to keep speeds low. There is however some safety concerns in this area as discussed in Section 2.1.2, possible mitigation of which is described in section 3.5.

3.3.2 Suitability of 20mph speed limits

Borough Green Parish Council has expressed a desire for the introduction of 20mph speed limits over two sections along the A227:

1. A227 - from the M26 over bridge to a point south of Potters Mede Sports Ground (a distance of some 375 metres)
2. A227 - from the junction of Fairfield Road to the junction with the A25 (a distance of around 550 metres)

Appendix E contains a report that details the assessment undertaken for the suitability of such limits for these sections in line with Department for Transport Circular 01/2013 – Setting Local Speed Limits..

The main findings for both sections are that a permanent 20 mph speed limit is not appropriate, due to the strategic and through traffic function of the road. However, a 20 mph advisory part-time speed limit should be considered for Grange Park and Wrotham schools, to operate for an appropriate time period in the morning and afternoon.

A 20mph advisory part-time speed limit for Borough Green Primary School may not be necessary given that vehicle speeds are already constrained in the area by the road alignment, its features and also if any of the safety improvements proposed in this report are implemented. This area would need to be reviewed once the appropriate traffic management measures have been agreed.

3.4 Review of speed limits above 30mph

Guidance set out in Department of Transport Circular 01/2013 on setting speed limits has been used as the basis for reviewing the current speed limits posted above 30mph on the A25 approaches to Borough Green from the Dark Hill roundabout in the west and the A25/A20 junction in the east. The speed limits currently posted are the national speed limit (60mph) form Dark Hill roundabout and 40mph from the A25/A20 junction.

The guidance highlights that the key factors to consider are: history of collisions; road geometry and engineering; road function; composition of road users; existing traffic speeds and road environment. Each section is discussed in turn below.

A25/A20 Junction to eastern 30mph speed limit at Borough Green

This 1.1km length, currently signed with a 40mph limit, is characterised by a small concentration of residential properties immediately west of the A25/A20 junction followed by intermittent development generally setback from the road. Its primary function is to cater for traffic movement due to its strategic nature and particularly with no competing traffic routes available.

The alignment is fairly gentle except at the western end where a reasonably sharp 'S' bend is located to pass beneath the rail bridge. Away from the junction it is essentially rural in nature boarded continuously with mature hedgerows and trees on both sides. No street lighting is present other than at the junction with the Nepicar Sand Quarry site. A footway is provided on one side throughout its length however pedestrian and other non-motorised presence is minimal.

Traffic speeds appear to lie between the range 40mph to 50mph although they have not been directly measured. At the 'S' bend speeds are constrained by its sharpness to around 40mph.

Over the 5 year period to March 2014 two personnel injury accidents have been recorded, one involving loss of control on the 'S' bend (serious) and one at the Nepicar Sand Quarry junction (slight). No pedestrians were involved.

Circular 01/2013 classifies roads suitable for 40mph as:

'*generally higher-quality suburban roads or those on the outskirts of urban areas where there is little development. They should have good width and layout, parking and waiting restrictions in operation, and buildings set back from the road. These roads should, wherever possible, cater for the needs of non-motorised road users through segregation of road space, and have adequate footways and crossing places'.*

When taking all the above into account, any reduction in the current speed limit appears difficult to justify and unlikely to be accepted by drivers who will probably perceive any reduction as not '*self-explaining*' or encouraging '*self-compliance*', these being key points emphasised in the Circular.

Furthermore, any increase in the speed limit, say to 50mph, is also considered inappropriate as such speeds cannot be achieved safely on the 'S' bend.

It is therefore considered that the current speed limit of 40mph should remain in force.

Dark Hill roundabout to western 30mph speed limit at Borough Green

With no development and negligible pedestrian presence along this short stretch of road a national speed limit appears appropriate when considered in isolation.

However, with the large step change in speed limit from 60mph to 30mph occurring some 70m within the urban fringe of Borough Green, an immediate speed reduction is needed.

Circular 01/2013 recognises these situations and suggests that it may be appropriate to use a short length of speed limit transition. In this regard it is proposed that a reduction in speed limit to 40mph commencing at the exit from the Dark Hill through to the current 30mph speed limit be introduced.

Some drivers may find such a speed limit dubious in this case, particularly when travelling out of town, but given the short distance to the Dark Hill roundabout it is likely to be tolerated.

3.5 Other Potential Safety Improvements

A25

Traffic management measures if implemented in line with the proposals described in this report should negate the need for any additional safety improvements on the A25.

Without such measures in place there is however concerns in two areas. The first is in regard to the continued presence of the pedestrian signal controlled crossing located to the east of Long Hill Lane. As previously highlighted, its low usage can cause drivers to become complacent over its existence and begin to ignore them.

It is suggested that, unless there is a specific local need for the signals, such as a high number of visually impaired/blind people dependency, the signals should be turned off (bagged) until such time as the Memorial Hall development is completed. With good visibility available in either direction, the assessment of gaps in the traffic by pedestrians to decide when it is safe to cross can be made safely.

The second concern relates to the apparent absence of any speed reduction measure(s) on the A25 western approach to the proposed mini roundabout associated with the Red Lion public house redevelopment. Such measures are believed essential on safety grounds and this should be investigated further.

A227

Section 2.1.2 identified three safety concerns on the A227 concentrated near the High Street area that should be addressed regardless whether traffic management measures are implemented.

The first related to the section between High Street and the A25/A227 junction where vehicles were seen to occasionally accelerate fast between on-street parking lengths, westbound, rather than wait for oncoming vehicles to pass.

A possible solution is to install a series of 'Speed cushions' in the eastbound lane opposite the parking bays (mid-point). The advantage with 'Speed cushions' is that they allow wide tracked vehicles such as buses and large emergency vehicles to straddle or partially straddle the speed cushion. They thus minimise discomfort for passengers and for emergency vehicles speeds are less compromised. With on-street parking assumed to be continually present, the need for Speed cushions in the westbound lane is unnecessary.

The second concern drew attention to the zebra crossing located immediately to the north of the rail bridge. The crossing is not easily seen by drivers approaching from the south due to the humped nature of the bridge and its general obscurity into the background. Raising the crossing on a road hump and replacing the poles and beacons with new LED lighting equipment will significantly enhance its presence and have a traffic calming effect. Traffic speeds are already low in the vicinity therefore a humped crossing should not adversely impact on traffic.

The remaining concern relates to poor visibility caused by the on-street parking for drivers emerging from the car park entrance situated to the west of High Street. The loss of one car parking space at the eastern end of the on-street parking to allow emerging vehicles to safely positioning themselves prior to continuing westbound appears to be the only practical solution.

3.6 Preliminary costings

Preliminary cost estimates are given in Table 3 for the various proposals and suggestions described in this report.

They are intended only to provide a broad appreciation of the likely costs and are subject to further review once details and other implications of the proposals are fully established.

Table 3 – Preliminary costs

Traffic Management Measure/Feature	**A25 Costs (£)**	**A227 Costs(£)**
Removal of centre line markings (hydroblasting) including provision of edge line markings	£50,000	£30,000
'Pinch Point' gateways (30mph/40mph speed limit change)	£6,000	£6,000
Advisory 20mph part-time signals	£3,000	£4,500
Conversion of pedestrian signal control crossings to Zebra crossing plus surface treatment	£45,000	£25,000
Chicane layouts (including cycle lanes)	£10,000	-
Upgrading of existing zebra crossings including surface treatments	£10,000	-
Surface treatment at High Street	£8,000	-
Conversion of pedestrian signal controlled crossing to Zebra (no surface treatment)	£20,000	-
Gateway surface treatment plus bollards	£1,500	-
Entry treatments plus bollards	-	£3,000
Raised crossing on hump, udgrading equipment (zebra) plus surface treatment	-	£12,000
Installation of speed cushions	-	£1,000
Allowance for TM and risks (25%)	£38,500	£20,500
Total	**£192,000**	**£102,000**

4 Conclusion and Recommendations

Borough Green is perhaps typical of many urban conurbations experiencing the consequences of inconsiderate driving, mainly speed related. Clearly, it is an issue high on the local agenda driven by local District Councillors and the Parish Council along with local residents who are determined to see improvements in the area to enhance road safety and improve the environment setting that is seen as very traffic dominant.

This study has provided and seen evidence of traffic speeds consistently above and in some cases well in excess of the posted speed limit yet the safety record does not appear to reflect a worrying trend in road safety. That said the study has identified areas where the potential for accidents is perhaps heightened as a result of particular features, adjacent use (i.e schools) and layout issues.

With the prospect of traffic volumes unlikely to experience any significant changes in the foreseeable future on either the A25 or A227, and given their strategic nature, any traffic calming should not be unduly severe.

However, as intimated above, some traffic calming is considered necessary and options presented in this report have been targeted to reduce overall mean speeds by around 5mph.

In terms of the suitability of introducing 20mph speed limits, again the strategic nature of the routes combined with; in general, a low pedestrian presence renders such a speed limit inappropriate. However, in recognition of several schools in the area, advisory 20mph part-time speed limits should be implemented in the vicinity of the schools for short durations when pupils are going to and leaving the school premises.

Measures recommended in this report to be taken forward for further consultation are described on drawing number 4300244/02.

Appendix A Study Area

Drawing Number	Title
4300244/01	**Study Area**

Appendix B Automatic Traffic Count Survey (February/March 2014)

Appendix C Crash Locations & Severities

Appendix D Scheme Drawings

Drawing Number	Title
4300244/02	**Traffic Management Options**
4300244/03	**Proposed Gateway**
4300244/04	**Proposed Eastern Chicane**
4300244/05	**Proposed Western Chicane**

Appendix E Suitability of 20mph speed limits

Report Ref: CO04300244/20mph report