Havering
LONDON BOROUGH

HIGHWAYS ADVISORY COMMITTEE
16 November 2021

Subject Heading:	**MAWNEY ROAD / WHITE HART LANE JUNCTION – PROPOSED ALTERATION TO EXISTING TRAFFIC CALMING MEASURES (The Outcome of public consultation)**
CMT Lead:	**Councillor Osman Dervish**
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Policy context:	**Havering Local Development Framework (2008) Havering Local Implementation Plan 2018/19 Delivery Plan**
Financial summary:	**The estimated cost of £0.0575m for implementation will be met by Highway Investment Programme (C30000)**

The subject matter of this report deals with the following Council Objectives

Communities making Havering	[x]
Places making Havering	[x]
Opportunities making Havering	[x]
Connections making Havering	[x]

SUMMARY

The Council approved funding for Mawney Road / White Hart Lane Junction – Proposed alteration to existing traffic calming measures, following concerns raised about road traffic accidents which have taken place at the junction of Mawney Road and White Hart Lane Romford, resulting in damage to residential properties.

A feasibility study was undertaken to support the existing measures and reduce vehicle speeds, including upgrading speed cushions to speed table, guard rails, upgrading bend and chevron signs to reduce the incidents involving damage to the property. A public consultation has been carried out and this report details the findings of this consultation and recommends that the safety improvements as detailed in the recommendation be approved.

The scheme is within **Mawneys** ward.

RECOMMENDATIONS

1. The Committee having considered the representations and information set out in this report recommends to the Cabinet Member for Environment in consultation with the Leader of the Council that the additional measures as detailed below and shown on the Drawing No. QT034/1 be implemented as follows:

   (a) Existing speed cushions outside property Nos. 391/392/394 Mawney Road and 3/5 White Hart Lane to be upgraded to speed tables.
   (b) Guard rails at the Mawney road / White Hart Lane Junction
   (c) Upgrading and relocating bend signs along Mawney road and White Hart Lane.
   (d) Upgrading Chevron signs at the Mawney Road / White Hart Lane Junction.

2. It is noted that following the consultation results, three guard rail panels along White Hart Lane will be removed from the original proposals of eleven guard rail panels as shown Drawing No. QT034/1 to reduce the risk for cyclists along White Hart Lane Cycle lane.

3. It is noted that the estimated costs of £0.0575m, will be met from the Highways Investment Programme Budget.

REPORT DETAIL

1.0 Background

1.1 Concerns have been raised about road traffic accidents which have taken place at the junction of Mawney Road and White Hart Lane Romford, resulting in damage to residential properties.

1.2 Traffic calming features such as speed cushions were installed several years ago in both Mawney Road and White Hart Lane as part of an accident reduction programme but unfortunately, driver behaviour means collisions are still occurring as a result of speeding at the Mawney Road / White Hart Lane Junction.

1.3 In order to prevent any further road traffic collisions Havering council has reviewed the measures already in place to consider possible additional controls to support the existing measures and reduce vehicle speeds.

1.4 The Mayor's Vision Zero Strategy aims to eliminate deaths and serious injuries on London's road network including **Havering** roads in light of previous incidents. The Mayor's aim is for no-one to be killed in or by a London Bus by 2030 and for all deaths and serious injuries from road collisions to be eliminated from London's roads and streets by 2041. The main targets are as follows:

(a) 65% reduction in KSIs by 2022 against 2005-2009 baseline average
(b) 70% reduction in KSIs by buses by 2022 against 2005-2009 baseline average
(c) 70% reduction in KSIs by 2030 against 2010-2014 baseline average
(d) 0 KSIs by 2041
(e) 0 KSIs by buses by 2030

The Mawney Road / White Hart Lane – Proposed alteration to existing traffic calming measures would help to meet the above targets.

Investigations and site surveys

1.5 Following on from the installation of speed reducing traffic calming measures residents and councillors raised concerns about speeding vehicles and consequent collisions when turning right from Mawney Road at its junction with White Hart Lane.

1.6 Officers investigated available collision data and Transport for London (TfL) collision records showed that one personal injury collision had occurred at the junction with Mawney Road and White Hart Lane over the three-year period to 31 December 2019, as a result of a chase by the Police with a civilian motorist. The civilian motorist lost control of their vehicle and hit the wall, causing a slight injury to the driver as well as damaging the wall of the property at Number 405 Mawney Road. The council was also made aware of another similar collision, involving Police, which had recently occurred, causing damage to the wall again but details of this incident were not available at that time.

1.7 Officers undertook a site visit to identify possible causes of these collisions but no evidence of any physical damage to the carriageway was identified. However, it was noted that both of these collisions took place during Police pursuits and in each case the other vehicle was driven at speed on the bend, with the civilian driver losing control when turning right into Mawney Road from its junction with White Hart Lane, which resulted in them hitting the property wall on both occasions.

1.8 Following on from a resident's petition to reduce vehicle speeds in a bid to protect damage to their properties from reoccurring, consideration was given to alternative traffic calming measures such as a mini roundabout and crash barriers but these measures were rejected because they were considered unsuitable for this particular location and details are provided below:

a) The implementation of a mini roundabout is not suitable due to sightline issues on the bend.
b) The implementation of Arco guard rail is only available in 30m lengths, however the length required this location to enable them to be effective in sustaining the impact of a vehicle collision is 40m which means that due to site constraints this option was not viable; and
c) The implementation of crash barriers cannot act as a speed reducing feature and would therefore not help to change driver behaviour. In addition, any collision could ultimately result in a fatality.

1.9 As an alternative it was proposed and agreed to install retroreflective hazard markers at the junction close to Number 405 Mawney Road to highlight the junction and kerb lines and these works were implemented in late 2020.

1.10 Further reports have now been made to the council from residents highlighting their concerns again as another speed chase has resulted in damage to the property at Number 405 and another vehicle which belonged to the resident at Number 407 Mawney Road.

1.11 The residents' concerns were also raised with the Romford Recorder which appeared in the Friday 2nd April edition, providing details indicating the bollards installed in Mawney Road were not serving their purpose and additional measures need to be provided.

1.12 Whilst officers have clarified on several occasions the bollards were not implemented to reduce speeds but to highlight the junction it is felt further measures could help to alter driver behaviour which in turn would reduce vehicle speeds. Whilst chicanes and speed humps have already been implemented in this area officers again considered the types of speed bumps and speed inhibitors available to support the measures already in place.

1.13 Speed bumps are usually made of plastic or rubber and clearly marked with paint. According to UK law, they can be as high as 100mm, so that a car has to slow down to 5mph to navigate one without damage. Because they need such a significant speed reduction, they're most often used in car parks, private roads and in some residential areas.

1.14 Speed humps are large bumps that span the entire width of the road with small gap for drainage. They look more like a feature of the road itself than speed bumps do, as they're covered in asphalt or tarmac. They also have a maximum height of 100mm, but they're usually not as tall as speed bumps. They're often used in residential areas but they're not suitable for bus routes.

1.15 Speed cushions are essentially speed humps that have been broken up into discrete parts. They look like short rectangular humps in the road that come in

twos or threes, depending on the width of the road. Because they're broken up, emergency vehicles; with their wider axles; can pass over them without slowing down.

1.16 Speed tables are elongated road humps that taper up from road level to a flattened top over a longer distance. They can be used at a junction or to form a pedestrian crossing. And they're easier for heavier vehicles to get over and;

1.17 Chicanes are artificially constructed bends that make the road into a snake-like shape. Drivers have to reduce speed to navigate the curves.

1.18 In addition to traffic calming measures consideration has been given to a possible junction design alteration to enhance the efficient movement of all road users whilst increasing convenience, comfort and safety at the same time.

1.19 Officers considered these options and it was agreed in this instance the measures in the proposals described below were best suited to further reduce vehicle speeds as drivers turned right from White Hart Lane into Mawney Road.

Proposals

1.20 The following safety improvements, as shown on the Drawing No. QT034, were proposed at the Mawney Road / White Hart Lane Junction to reduce vehicle speeds and minimise collisions.

(b) Existing speed cushions outside property Nos. 391/392/394 Mawney Road and 3/5 White Hart Lane to be upgraded to speed tables.

(b) Guard rails at the Mawney road / White Hart Lane Junction

(c) Upgrading and relocating bend signs along Mawney road and White Hart Lane.

(d) Upgrading Chevron signs at the Mawney Road / White Hart Lane Junction.

2.0 Outcome of public consultation

2.1 Letters, describing the proposals were delivered to local residents / occupiers. Approximately, 170 letters were delivered via post to the area affected by the proposals. Emergency Services, bus companies, local Members and cycling representatives were also consulted on the proposals. Eleven written responses from Local Members, Cycling representative, Better streets for Havering and residents were received and the comments are summarised in the Appendix 1. The Local Members expressed support for the scheme. Of the eight written responses, seven are generally support the scheme and one object to the speed table outside the resident’s property. Cycling representatives and Better streets for Havering support the scheme but they raised concerns about the provision of guardrails due to risk for cyclists. One objection received for the speed table outside the property due to increase noise; collisions caused by criminal and speeding in other locations along the roads. The resident did however support other part of the proposals and details of the comments are shown in the Appendix 1.

2.2 Details of some of the operational Casualty Reduction Schemes implemented within Havering, TfL's targets, Mayor's vision zero Strategy and traffic calming techniques are summarised in the Appendix 2.

3.0 Officers' comments and recommendations

3.1 The collision analysis indicated that one personal injury collisions (PICs) was recorded at the Mawney Road / White Hart Lane Junction, causing a slight injury to the driver as well as damaging the wall of the property at Number 405 Mawney Road. The council was also made aware of another similar collision, involving Police, which had recently occurred, causing damage to the wall again but details of this incident were not available at that time.

3.2 Appendix 2 provides commentary / Analysis of the effectiveness of implemented Casualty Reduction Schemes, traffic calming measures and other features used in the Council's Casualty Reduction Programme, TfL's targets, Mayor's Vision Zero Strategy, UK Traffic calming techniques and their effect.

3.3 Officers prepared a set of proposals which are considered appropriate for Mawey Road / White Hart Lane Junction. Both members, residents and consultees are in favour of the proposals which should influence driver behaviour and reduce collisions. Officers' recommend that all suggested measures should be implemented.

IMPLICATIONS AND RISKS

Financial implications and risks:

This report is asking HAC to recommend to the Cabinet Member the implementation of the above scheme.

The estimated cost of £0.0575m for feasibility, consultation and implementation will be met by Highway Investment Programme Budget (C30000).

The costs shown are an estimate of the full costs of the scheme, should all proposals be implemented. It should be noted that subject to the recommendations of the committee a final decision would then be made by the Lead Member – as regards actual implementation and scheme detail. Therefore, final costs are subject to change.

This is a standard project for Public Realm and there is no expectation that the works cannot be contained within the cost estimate. There is an element of contingency built into the financial estimate. In the unlikely event of an overspend, the balance would need to be contained within the overall Public Realm budget.

Legal implications and risks:

The Council's power to construct and maintain places of refuges for the protection of pedestrians in the maintained highway is set out in Part V of the Highways Act 1980 ('HA1980')

The Council's power to construct road humps in highway maintainable at public expense is set out in Part V of the HA 1980. The Council also has a general power of highway improvement under Part V of the HA 1980 which includes the provision of, pillars, walls, barriers, rails, fences or posts for the use or protection of persons using a highway.

Before making an order relating to the construction of road humps the Council should ensure that the statutory procedures set out in section 90C, Part V of the HA 1980 and the Highways (Road Humps) Regulations 1999 are complied with.

The Council has powers to install traffic signs on its road network by virtue of powers granted under Part V of the Road Traffic Regulation Act 1984, with S65 granting powers and giving duties for the placing of traffic signs.

The form and conditions under which traffic signs may be installed are prescribed by the Traffic Signs Regulations & General Directions 2016 and road markings that indicate stopping controls are prescribed traffic signs for this purpose.

Section 122 RTRA 1984 imposes a general duty on local authorities when exercising functions under the RTRA. It provides, insofar as is material, to secure the expeditious, convenient and safe movement of vehicular and other traffic (including pedestrians) and the provision of suitable and adequate parking facilities on and off the highway. This statutory duty must be balanced with any concerns received over the implementation of the proposals.

In considering any responses received during consultation, the Council must ensure that full consideration of all representations is given including those which do not accord with the officer's recommendation. The Council must be satisfied that any objections to the proposals were taken into account.

In considering any consultation responses, the Council must balance the concerns of any objectors with the statutory duty under section 122 RTRA 1984.

Human Resources implications and risks:

The recommendations made in this report do not give rise to any identifiable HR risks or implications that would affect either the Council or its workforce.

Equalities Implications and Risks:

The Council has a general duty under the Equality Act 2010 to ensure that its highway network is accessible to all users. Where infrastructure is provided or substantially upgraded, reasonable adjustments should be made to improve access. In considering the impacts and making improvements for people with

protected characteristics (mainly, but not limited to disabled people, the young and older people), this will assist the Council in meeting its duty under the Act.

Havering has a diverse community made up of many different groups and individuals. The council values diversity and believes it essential to understand and include the different contributions, perspectives and experience that people from different backgrounds bring.

The Public Sector Equality Duty (PSED) under section 149 of the Equality Act 2010 requires the council, when exercising its functions, to have due regard to:

(i) the need to eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under the Equality Act 2010;
(ii) the need to advance equality of opportunity between persons who share protected characteristics and those who do not, and;
(iii) foster good relations between those who have protected characteristics and those who do not.

Note: 'Protected characteristics' are: age, sex, race, disability, sexual orientation, marriage and civil partnerships, religion or belief, pregnancy and maternity and gender reassignment.

The council demonstrates its commitment to the Equality Act in its decision-making processes, the provision, procurement and commissioning of its services, and employment practices concerning its workforce. In addition, the council is also committed to improving the quality of life and wellbeing of all Havering residents in respect of socio-economics and health determinants.

There would be some visual impact from the proposals; however these proposals would generally improve safety for both pedestrians and vehicles.

BACKGROUND PAPERS

(1) Cabinet Member briefing notes
(2) Public consultation letter

APPENDICES

Appendix 1 – Summary of response

Appendix 2 - Summary of casualty targets, casualty reduction, traffic calming techniques and their effect.

Appendix 3 – Drawing No. QT034/1

Appendix 4 – Drawing No. QT034

Appendix 5 – Public consultation letter

APPENDIX 1
SUMMARY OF RESPONSE

RESPONSE REF:	COMMENTS	STAFF COMMENTS
QT034/1 (Mawneys Member 1)	I have now reviewed the proposals and I am very pleased with the design	-
QT034/2 (Mawneys Member 2)	I am happy with the design	-
QT034/3 (Mawneys Member 3)	I am happy for you to go ahead with the proposals	-
QT034/4 (Metropolitan Police)	-I have no objections in principle to your proposals -The impact of traffic calming schemes on accident levels is generally related to both the speed reducing effect of the scheme and on any reduction in traffic levels as a consequence of it. Slower vehicle speeds not only reduce the occurrence of accidents, but also have a significant effect on their severity. - The spacing of the measures is critical to their effectiveness. - Vertical shifts in the carriageway have a greater impact on vehicle speeds than any other measures. - have any alternative proposals considered here?	-We only use 75mm high vertical deflection as opposed to maximum 100mm to minimise residents' complaints about noise and vibration. - This scheme only involves two speed tables. We are not proposing a series of speed tables. - We have considered various alternatives such as mini roundabout, crash barrier etc. and they are not suitable for this site.
QT034/5 Better Street for Havering	- We support the use of speed tables which will be more effective at slowing drivers before the bend, although the ramps should be sinusoidal in profile for the comfort of people cycling -We do not support the use of guardrail as oi will add street clutter and create a safety risk to people cycling. Being on the outside of a bend on a cycle route, it creates a risk to people cycling being pinned against it by a vehicle. This is a long established risk factor for people cycling.	- Proposed ramps will be sinusoidal profile. - Due to the cycle lanes, we will be reducing three guardrail panels along White Hart Lane to minimise the risk for cyclists. However, we will install eight guardrail panels to minimise the occurrence of

	-We take no particular view on the signs being upgraded. -We would request that the cycle lanes be widened to a minimum of 1.5 metres as set out in LTN/1/20.	incidents that property wall being hit by vehicles. - We will consider wider cycle lanes at a later date.
QT034/6 Havering cyclists	-Speed tables will be more effective at slowing drivers before the bend -Speed tables should have sinusoidal ramps -Guardrail will add street clutter and create safety risk to people cycling. It's on the outside of the bend and is risk of people getting pinned by an errant driver. It's also going to hit and will cost money to repair. -No particular views on the signs being upgraded. -May be the cycle lanes should be widened at the same time	- Proposed ramps will be sinusoidal profile. - Due to the cycle lanes, we will be reducing three guardrail panels along White Hart Lane to minimise the risk for cyclists. However, we will install eight guardrail panels to minimise the occurrence of incidents that property wall being hit by vehicles. - We will consider wider cycle lanes at a later date.
QT034/7 (White Hart Lane resident)	Object to the upgrade of the speed humps to a speed table outside of my property for the following reasons. -There is already some noise caused by the speed cushions but mainly caused by vehicles scraping them, the marks are clearly visible from where this happens. At present HGVS and buses do not generate noise by going over them but a speed table would. Although buses stop between 1.15 to 4.30am, the Royal mail lorries run through the night and at some speed. CCTV evidence can support my statement. Should this proceed and my rights are affected then I would take legal action. -This part of the plan will have no benefit to the issues raised by 405 Mawney Road. -In the last seven year of living here there has only been one incident	-It is considered that the provision of speed tables at this location would reduce vehicle speeds and noise. It will also minimise collisions. Unfortunately, collisions are

	driving from White Hart Lane round to Mawney Road and that was caused by a Police chase. Criminals do not care about speed cushions or tables when they are trying to get away. The majority of incidents at 405 have been from police chases, drunk drivers or stolen cars. Not from average member of the public. -Has consideration been given to drivers speeding up after they go over the speed table as they have to slow down more on the approach? This may increase the number of accidents due to behavioural change in the drivers making up for lost time. -There are no other objections to any other part of the proposals as it does not have potential to impact mw or will improve 405 resident.	occurring at this location and the property wall being hit on several occasions. It is necessary to reduce vehicle speeds at this junction. We have considered the impact of the proposals. Due to the speed cushions along Mawney Road and White Hart Lane, it is considered that the speeding would not cause a significant problem given that the traffic calming measures along these roads have reduced collisions significantly except at this junction.
QT034/8	How about turning the junction into a mini roundabout.	Mini roundabout is not suitable for this location due to visibility problem.
QT034/9 (Mawney Road Resident 1)	I am writing to discuss my views on the safety measures on the corner of Mawney Road and Whitehart Lane. My main thought is why has it taken so long before anything has been done! As the homeowner of 405 Mawney Road, I have had my home and my life hugely affected by four serious crashes at this junction. I feel annoyed and angry that my home has been destroyed from four car crashes that happened in the short space of 18 months. The repairs that we have to make, are going to cost us thousands of pounds. We are just lucky that our children were not in our back garden when a car crash landed there. We are so fortunate no one has been hurt or killed here. I do believe in the late 70's a crash did happened at the end of my garden and there was a fatality. This bend	Although there are few collisions occurred at this location over the years, TfL records showed that only one personal injury collision occurred at this junction over last five year period. We are currently addressing and are proposing measures to minimise these occurrence.

	needs to be made safe before this happens again. I've been made to feel unsafe in my own home. I feel sick every time I hear sirens, awaiting a crash. I no longer want to live here but I have no choice.	
QT034/10 (Mawney Road Resident 2)	The junction of White Hart lane and Mawney Rd. has seen a number of incidents over the past few years and it is purely by luck that no one has been killed or seriously injured, not least the residents of 406 Mawney Rd. The most recent incidents have been caused by drivers who were either under the influence of drink/drugs or who were in stolen vehicles. Whilst traffic calming measures would work with sober or law abiding drivers the ones involved in these recent incidents are either oblivious to their speed in relation to the bend that they are approaching or else they are only intent with getting away from any pursuit as well as having an over-estimation of their driving abilities. Priority must be given to the protection of the residents of No.406 and the only feasible way to do this is to install "Armco" type barriers on the outside of the bend in order to prevent vehicles from crashing through what is left of the garden wall. I appreciate that there would be disruption to traffic whilst the work is carried out and this would require a 3-way traffic light system but the end would definitely justify this. The family at 406 deserve nothing less than a high level of protection and that work must be carried out as soon as possible with the absolute minimum of "chat" before someone does get killed. Winter is fast approaching so, please, get it done now.	Although there are few collisions occurred at this location over the years, TfL records showed that only one personal injury collision occurred at this junction over last five year period. We are currently addressing and are proposing measures to minimise these occurrence. Crash barriers are not suitable for this location.
QT034/11 (Walmer Close	Firstly I am appalled that it has taken so long to address this ongoing issue.	Proposed measures would improve the

Resident)	I live in Walmer Close, opposite this junction and walked past this corner daily with my children when taking them to school. One morning I walked past this junction approximately five minutes before a vehicle ploughed into the wall. It would have almost certainly killed me and the children, or anyone else passing, if the timing had been different. I am disappointed and disgusted that three or four more accidents occurred before you took the trouble to address this junction. It is a miracle nobody was killed. The posts (recently installed on that corner) do not seem robust enough to me and there are not enough of them. I think at least 5 or 6 more should be added. Maybe a camera could be put up before you approach the bend also to encourage speed reduction. The road markings and speed bumps are not enough.	situation and minimise these incidents at this location.

APPENDIX 2

SUMMARY OF CASULATY TARGETS, CASUALTY REDUCTION, TRAFFIC CALMING TECHNIQUES AND THEIR EFFECT

1. PERCENTAGE OF CASUALTY REDUCTION

The following table shows the percentage of casualty reduction achieved on the implementation of Accident Reduction Programme schemes in recent years using vertical deflections such as humped crossings, speed tables and speed cushions.

SCHEME	IMPLEMENTATION DATE	PERCENTAGE CASUALTY REDUCTION
Mawney Road and White Hart Lane Between A12 and Collier Row Road	March 2012	77%
Hornchurch Town Centre (20mph zone)	June 2012	45%
Collier Row Lane Between Goring Road and Playfield Avenue	March 2014	60%
Crow Lane Whole length	March 2015	40%
Dagnam Park Drive Between Gooshays Drive and Chudleigh Road (20mph zone)	January 2016	100%
Rainham Road Between Ford Lane and Wood Lane	December 2016	50%

Please note that vertical deflections such as humped crossings, speed tables, speed cushions were used in all the above schemes to reduce accidents. The casualties are compared before and after implementation of the schemes.

2. TFL 2020 CASUALTY TARGETS

The Government and Transport for London have set targets for 2020 to reduce Killed or Serious injury accidents (KSI) by 40%; Child KSIs by 50%; pedestrian, cyclist KSI's by 50% and slight injuries by 25% from the baseline of the average number of casualties for 2005-09. The **Havering** Accident Reduction Programme, funded by Transport for London will help to meet these targets.

3. LONDON MAJOR'S VISION ZERO STRATEGY

The Major's Vision Zero Strategy aims to eliminate deaths and serious injuries on London's road and street network including **Havering** roads in the light of previous incidents. The Major's aim is for no-one to be killed in or by a London Bus by 2030 and for all deaths and serious injuries from road collisions to be eliminated from London's road and street by 2041. The main targets are as follows:

(a) 65% reduction in KSIs by 2022 against 2005-2009 baseline average
(b) 70% reduction in KSIs by buses by 2022 against 2005-2009 baseline average
(b) 70% reduction in KSIs by 2030 against 2010-2014 baseline average
(d) 0 KSIs by 2041
(e) 0 KSIs by buses by 2030

4. TRAFFIC CALMING TECHNIQUES IN UK AND THEIR EFFECT ON SPEED REDUCTION, ACCIDENT REDUCTION AND AIR QUALITY/ HEALTH/ POLLUTION

(a) TRAFFIC CALMING TECHNIQUES

The following 'Traffic calming techniques' are widely used in UK.

(1) Vertical deflections include Road hump, speed table, speed cushions, rumble strips
(2) Horizontal deflection include Chicanes
(3) Road Narrowing
(4) Central islands
(5) Traffic calming at junctions includes changes in alignment, roundabout and mini roundabouts.
(6) Gateway measures include different surface materials, traffic islands, 20/30mph road signs
(7) Speed cameras and speed limit changes
(8) Traffic management measures include road closures and one way streets

All the above traffic calming measures are not suitable for all the roads in **Havering**. The selected traffic calming measures are generally used depending on the road character and nature of achievement such as speed reduction and accident reduction.

(b) SPEED REDUCTION

Vertical deflections such as road humps, speed tables and speed cushions in the carriageway have a **greater impact on vehicle speeds** than any other measures. In order to achieve greater vehicle speeds reduction, the vertical deflections need to be placed close apart which may require greater funding.

(c) ACCIDENT REDUCTION

The impact of traffic calming schemes on accident levels is generally related to both the speed reducing effect of the scheme and any reduction in traffic levels as a consequence of it. Slower vehicle speeds in 20mph speed limit roads compared with 30mph or over speed limit roads, not only reduce the occurrence of the accidents, but also have a significant effect on their severity such as from fatal and serious injuries to slight injuries.

(d) AIR QUALITY / HEALTH / POLLUTION

WHAT IMPACT DO SPECIFIC SCHEMES HAVE ON AIR QUALITY AND HEALTH?

The Transport for London research suggest:

(i) 20mph zones **do not increase air pollution**. Imperial College University's evaluation of 20mph zones in London suggested they had **no net negative impact on exhaust emissions** and resulted in clear benefits to driving style and associated particulate emissions.

(ii) Speed bumps generate small, local increase in emissions, but the heath impacts are likely to be **negligible**. They dramatically reduce road danger and support the Health Street Approach. It is uncertain whether speed bumps have negative impacts on air quality over the whole area of a scheme. There is good evidence they are one of the best ways to reduce vehicle speeds and are expected to reduce collisions by around 44%. Speed tables should be considered as an alternative to speed bumps.

(iii) Protected cycle lanes tend not to prolong journey time and are **not expected to increase air pollution.**