APPENDIX 1: ANALYSES AND TECHNICAL INFORMATION

AVERAGE TRAFFIC SPEEDS IN THE CITY OF LONDON

1. In February–March 2013 the City commissioned from MHC Traffic Ltd comprehensive monitoring of the average spot mean speeds on the City's streets (including the Transport for London road network in the City). At each of the 59 sites data were collected 24 hours per day for around a fortnight.

2. The average spot mean speed across all 59 surveyed sites across the City was 21.9mph.

3. This result of an average City traffic speed (across the whole 24 hours of the day) of 21.9mph contrasts with the usual average traffic speeds in the City of around 8–10mph that are usually quoted and reported to your committees. There are two reasons for this: differing survey methodologies and differing survey periods.

Survey Methodologies

4. The standard City traffic survey is conducted biannually, in the relatively neutral months of April and October. It measures what traffic engineers refer to as "**space mean speed**". This is the average speed of all of the motor vehicles travelling along a defined length of street over a defined period. For the standard City traffic survey this is usually a street, a section of a longer street or a short run of a number of short streets forming a clear route, from junction to junction (often traffic signal-controlled ones), which are referred to as surveyed "links". On such a link in the City motor vehicles will typically start from a stopped position in the traffic queue at the junction, accelerate to the maximum speed achievable by the traffic conditions, and then brake to a stop for the next junction. Some runs are undertaken without this pattern, with green lights allowing continuous running and lighter traffic conditions allowing speeds to approach or be at or above the speed limit. Each link is driven 30 times for each survey to avoid unusual events skewing the data. The speed data recorded by the standard City survey are therefore the average speeds over the whole of each link, including the time spent at low speeds or stopped at junctions and for other interruptions such as pedestrian crossings and street works and roadworks.

5. The survey conducted in February and March by MHC Traffic Ltd instead measured what traffic engineers refer to as "**time mean speed**" (rather than

the standard City survey's "space mean speed"). Time mean speed is the average speed of all of the motor vehicles passing a defined point over a defined period. This point is usually set where motor vehicles are likely to be at their maximum speed on that link, i.e., the point at which vehicles are likely to have finished accelerating away from the previous junction but have not yet started braking for the next junction. Such speed data are often called "spot mean speeds", being average speed data obtained at a particular individual spot (rather than over a link). As time mean speed surveys are capturing speeds at or near to vehicles' maximum speeds, the average speeds obtained by these surveys are invariably higher than the average speeds obtained by "space mean speed" surveys, when the whole range of vehicle speeds are being captured and averaged.

6. Spot mean speeds (the data obtained from time mean speed surveys) are what are required to analyse and set appropriate speed limits, as it is motor vehicles' maximum (or near maximum) speeds that are of relevance to speed limits. This is in accordance with national guidance and traffic management industry best practice.

Survey Periods

7. In addition, as the standard biannual City traffic survey (space mean speed survey) is primarily concerned with measuring and analysing the changes in journey times caused by peak-period disruption from street works, roadworks and other changes to the street environment, it is conducted during peak periods only, with surveys conducted 10 times during 3 time periods (starting at 7 a.m., 12 p.m. and 4 p.m.), making 30 runs in total for each link of each survey.

8. With the 20mph investigation however, as the speed limit would be applicable 24 hours per day, 24-hour data are required, and the time mean speed survey conducted by MHC Traffic Ltd was therefore continuous around the clock, with several hundred hours of data per site. As the standard City traffic surveys have traditionally sought to demonstrate the scale of the congestion problem in the City and the change over time these surveys have collected congested peak-period data only. In contrast the MHC Traffic survey was 24 hour, the spot mean speeds obtained by the later survey are significantly higher than the average speeds of the standard survey.

ASSESSMENT OF THE PRINCIPAL BENEFITS AND DISBENEFITS OF A CITY-WIDE 20MPH ENVIRONMENT

9. There are several key areas that need to be investigated to assess all of the likely principal benefits and disbenefits of a 20mph environment in the City. These are:—

    - the likely changes in the frequency of road traffic collisions and the severity of road traffic casualties;

    - the likely changes to average journey times for all road user classes (including buses);

    - the likely changes to the environments for walking and cycling/modal shift to or from walking and cycling;

    - the likely changes in the emissions of air pollutants and greenhouse gases from road vehicle exhausts, including as a result of modal shifts;

    - the likely changes in the emissions of air pollutants from road vehicle brake and tyre wear, including as a result of modal shifts;

    - the likely changes in noise pollutants and excessive vibration from road traffic, including as a result of modal shifts; and

    - the likely impact on public health as a result of modal shifts.

10. The conclusions in respect of these principal benefits and disbenefits are set out in the *following* sections.

LIKELY CHANGES IN THE FREQUENCY OF ROAD TRAFFIC COLLISIONS AND THE SEVERITY OF ROAD TRAFFIC CASUALTIES

Theoretical Maximum Range of Changes in Collisions and Casualties

11. In theory, a change to a 20mph environment could *increase* the number of road traffic collisions and/or the number and/or severity of road traffic casualties. It has been suggested that this could occur through the slower vehicle speeds and resulting more relaxed environment causing greater inattention among road users (whether they be drivers, vulnerable road users such as pedestrians and cyclists, or both).

12. At the other end of the scale, a change to a 20mph environment could, in theory (if such a scheme was totally effective in reducing road dangers), reduce the numbers of collisions and casualties to none.

Realistic Range of Changes in Collisions and Casualties

13. The 30mph speed limit is longstanding, having been the default speed limit on British highways since 18 March 1935[1]. There seems to be no evidence that road user inattention correlates significantly with average traffic speeds. The possibility of an increase in the number of road traffic collisions and/or severity of casualties as a result of a change to a 20mph environment is therefore discounted for the purposes of this report.

14. At the other end of the scale, a reduction in casualties to nil as a result of a change to a 20mph environment seems extremely unlikely because many road traffic collisions are caused by factors other than excessive speed and because if a collision does occur with a vulnerable road user at 20mph a slight casualty is still the most likely result.

15. Circular 01/2013, *Setting Local Speed Limits*, advises that "Research shows that on urban roads with low average traffic speeds any 1 mph reduction in average speed can reduce the collision frequency by around 6%"[2]; and that "If the mean speed is already at or below 24mph on a road, introducing a 20mph speed limit through signing alone is likely to lead to general compliance with the new speed limit"[3]. Of the 59 surveyed sites across the City, spot mean speeds were below 24mph at 52 of them (i.e., at 88% of them) and below 20mph at 32 of them (i.e., at 54% of them).

16. Officers have looked at all of the road traffic casualties that occurred in the City over the last three years and have made two assumptions in predicting the likely reductions in casualties that would occur with the implementation of a 20mph environment in the City, using the research behind and advice contained within Circular 01/2013.

17. Firstly, that where a casualty occurred in a location where the City's speed survey indicates that the spot mean speed was 20mph or less[4], there would be no impact on casualties, and the same number of casualties in these locations would occur with a 20mph environment. Secondly, that where a casualty occurred in a location where the City's speed survey indicates that

[1] as a result of the coming into force of the Road Traffic Act 1934
[2] paragraph 82
[3] paragraph 95
[4] Where speeds were not surveyed on the relevant street or section of street, spot mean speed data from the most comparable street or street section were used instead.

the average spot mean speed was more than 20mph, the number of casualties in these locations would be reduced by 6% per 1 mile per hour above 20mph, up to a maximum of 24% (i.e., as a result of the maximum realistic reduction in traffic speeds of 4 mph). For example, at a location where the spot mean speed was 22mph, casualties would be reduced by 12% (22mph – 20mph = 2mph, multiplied by 6% per 1mph); and at a location where the spot mean speed was 25mph, casualties would be reduced by 24% (4mph multiplied by 6% per 1mph).

18. Having undertaken this analysis, a reduction in casualties of 8.6% is predicted. Over three years[5] this represents a reduction in casualties from 1,228 to 1,122.5, i.e., a reduction of 105.5 casualties.

19. This predicted 8.6% reduction in casualties compares to the targeted 12.5% reduction in casualties by 2013 and 30% reduction in casualties in the City by 2020, from the baseline of the 2004–2008 average, as set out in the Local Implementation Plan and the Road Danger Reduction Plan.[6]

LIKELY CHANGES TO AVERAGE JOURNEY TIMES FOR ALL ROAD USER CLASSES (INCLUDING BUSES)

Theoretical Maximum Range of Changes in Average Journey Times

20. In theory, a change to a 20mph environment could *decrease* average City journey times by smoothing traffic flow and thereby letting more traffic through some junctions in some conditions. Better traffic flow at lower speeds is a well understood traffic phenomenon. Lower speeds allow reduced following distances, in turn allowing more vehicles to travel safely in the same amount of space. Managed speed reduction is regularly made use of in active traffic management, for example when the Highways Agency reduces the speed limit on motorways in high flow conditions below the standard 70mph motorway speed limit in order to improve traffic flow and thereby decrease average journey times for all users. However, no evidence could be found as to exactly how much additional throughput of traffic could potentially occur in lower speed (congested) traffic conditions such as habitually occurs in the City during the working day.

[5] Three years is the standard road traffic casualty reporting period, in order to reduce the impact of any anomalous results.

[6] However, these predictions need to be seen in the context of significant increases in the total number of persons injured in road traffic collisions in the City since the Local Implementation Plan target baseline period of 2004–2008 (inclusive).

21. At the other end of the scale, the maximum change in average journey times that could result from the implementation of a 20mph environment in the City is, theoretically, a 50% increase. This would occur when traffic is entirely free flowing and uninterrupted and motor vehicles can travel at the speed limit for their entire journey, i.e., when there is no traffic congestion and no delays caused by the need to slow down for or give way at junctions (as a result of traffic signals, stop signs etc.). Over the longest direct journey that it is sensible to make by motor vehicle entirely within the City, along the A3211 (Upper and Lower Thames Street) from Temple Place to Trinity Square[7], which is a journey of approximately 1.6 miles, this would represent an increase from 3 minutes 12 seconds to 4 minutes 48 seconds, i.e., an increase of 1 minute 36 seconds (staying within speed limits).

22. However to do this journey without having to stop is unlikely, even in the early hours of the morning. (One of our staff tried it several times at that time of day and found the increased average journey time to be 1 minute 5 seconds, from 3 minutes 35 seconds to 4 minutes 40 seconds). An increase in total journey time from Temple Place to Trinity Square of 1 minute 36 seconds is therefore not a realistic estimate of the likely maximum increase in average journey times resulting from a change to a 20mph environment. This is particularly so as a journey along the whole of the City part of the A3211 is not representative of journeys within the City. It is a through-traffic journey, whereas most motor vehicle journeys within the City have (thanks to the traffic and environment zone and the congestion charging zone along with the successful implementation of other policies such as parking supply restraint) an origin and/or a destination within the City.

23. As a result, an alternative approach to the likely change in average journey times resulting from a change to a 20mph environment is adopted in this report. The City's monitoring of spot mean speeds indicates that the highest average speed along the City part of the A3211 was 28.1mph. A 20mph scheme would likely reduce this average to around 24mph. This would represent an increase in average journey times of 35 seconds (i.e., an increase from 3 minutes 25 seconds to 4 minutes, which is an increase of 17%). If a 20mph scheme was successful in lowering the average speed along the City part of the A3211 to 20mph, this would represent in an increase in average journey times of 1 minute 23 seconds (i.e., an increase from 3 minutes 25 seconds to 4 minutes 48 seconds, which is an increase of 41%).

[7] Victoria Embankment–Blackfriars Underpass–Upper Thames Street–Lower Thames Street–Byward Street

Most Likely Change in Average Journey Times

24. As discussed *above*, a journey along the whole of the City part of the A3211 is not representative of the majority of journeys within the City. The City's monitoring of spot mean speeds indicates that the average across all 59 surveyed sites was 21.9mph. A successful 20mph environment scheme would reduce this average to a little below 20mph.[8] (for simplicity, 20mph is adopted for the purpose of this calculation). If we then took a cautionary approach and assumed that the average journey length within the City is 1.6 miles (i.e., the same as the A3211 from City boundary to boundary) then the average journey times would increase by 25 seconds (i.e., an increase from 4 minutes 23 seconds to 4 minutes 48 seconds, which is an increase of 10%).

Bus Journey Times

25. Given that buses must inevitably stop often to pick up and set down passengers, especially in a dense urban environment such as the City, the *above* analysis about journey times in general is true of buses; and, to the extent that there are journey-time factors that are specific to buses, this will mean that a 20mph environment would have less effect on buses than on other motor vehicle traffic, as buses will less often reach a maximum speed greater than 20mph.

LIKELY CHANGES TO THE ENVIRONMENTS FOR WALKING AND CYCLING/MODAL SHIFT TO OR FROM WALKING AND CYCLING

26. A 20mph environment in the City would have a positive impact on the quality of the environment for journeys made by walking and by cycling. In the absence of large-scale opinion surveys, it is not possible to adequately quantify such subjective improvements in journey quality, but the effects in terms of producing a more relaxed City street environment, in which both walking and cycling were less stressful and more enjoyable, would likely be highly significant. Indeed, these subjective but very positive effects rank along with casualty reductions as among the most important potential benefits of a 20mph environment for the City.

27. Walking is already popular, so no change is anticipated there. With cycling however, given the relatively low existing modal share, the picture is different.

[8] It will not be exactly 20 mph as some average speeds are already, and would remain, below 20 mph, so if the upper limit of the sampled average speeds is reduced to closer to 20 mph by the introduction of a 20 mph speed limit, the average of the averages will be below 20 mph.

28. In attempting to quantify this potential, in the absence of robust local data, your officers have looked at the results obtained where 20mph or 30km/h environments have been implemented elsewhere. These examples show a wide range of changes in cycling modal share. There is rarely a definitive causal link that can be established between changes in motor vehicle speeds and changes in cycling modal share; nevertheless, in virtually all examples examined cycling increased, and therefore it seems reasonable to assume that lower motor vehicle speeds result in improved conditions for cycling and in an increased modal share for cycling, even if the precise increase cannot be predicted with much certainty. An increased modal share for cycling as a result of the implementation of a 20mph environment in the City therefore seems a reasonable assumption and is supported by the evidence.

29. Examples at the higher end of reported changes of the noted range of changes in modal share for cycling as a result of the implementation of 20mph/30km/h environments: in Germany the national research programme reported a doubling of bicycle use over a four-year period; in central Berlin's Moabit district following the establishment of 30km/h zones an increase in cycling of 50% was reported; and in Buxtehude (in metropolitan Hamburg)[9] an increase in cycling of 27% was reported following the introduction of similar zones.

30. Here in England, two 20mph zones that were implemented in Bristol in 2009 without traffic calming features were reported as increasing the number of people cycling by between 4% and 36% (depending on the survey location); and, in opinion surveys conducted in the two zones, 11% of respondents in one zone and 16% of respondents in the other zone reported that they cycled more often since the 20mph zones were introduced.

LIKELY CHANGES IN THE EMISSIONS OF AIR POLLUTANTS AND GREENHOUSE GASES FROM ROAD VEHICLE EXHAUSTS, INCLUDING AS A RESULT OF MODAL SHIFTS

Likely Changes in the Emissions of Air Pollutants and Greenhouse Gases

31. Most previous research on exhaust emissions at differing vehicle speeds has shown that emissions are higher at 20mph than at 30mph. This is a function of the research usually comparing continuous driving at 20mph with continuous driving at 30mph. Continuous driving at the higher speed

[9] part of the national traffic calming demonstration project

covers the same distance for less fuel use, meaning that fewer emissions are created. Most modern internal combustion engines, both petrol and diesel, tend to work more efficiently when propelling vehicles at 30mph than at 20mph, partly because of operating at higher temperatures at the higher speed.

32. However, this comparison very poorly represents actual driving conditions in a congested, high density urban environment. Such environments typically involve much more stop/start driving than the free-flow continuous driving that most studies have analysed. In such conditions idling, accelerating and decelerating become significant, often very significant, factors and the relative emissions resulting can differ substantially from those of continuous driving at different speeds. In particular, the reduced range of speeds between idling (i.e., 0mph) and maximum (i.e., 20mph) in a 20mph environment (i.e., a range of 20 mph) compared to the 30mph range of speeds in a 30mph environment means that acceleration and deceleration is reduced in time and usually also in magnitude. In other words, drivers in a higher-speed environment not only take longer to reach their maximum speed or slow down to a halt, but they also accelerate and decelerate faster in order to reduce the amount of time spent moving between idling and maximum speed. As acceleration is particularly significant for exhaust emissions, as this is when a vehicle's power demand is greatest, and as acceleration and deceleration (which encompasses braking) is particularly significant for brake and tyre wear, the reduced amount of time spent accelerating and decelerating and the reduced magnitude of acceleration and deceleration in lower-speed environments is likely to be significant for emissions performance when vehicles speeds often need to be modified, as is the case in high density urban environments.

33. To look into the actual emissions impacts of driving in 20mph environments and driving in 30mph environments in Central London the Central London sub-regional transport partnership (which includes the City and which is directed by Central London Forward) commissioned Imperial College London to undertake a comprehensive emissions study of driving in Central London. The resulting study[10] was published on 10 April 2013. It includes estimations of the emissions of fine particles (PM_{10}) and oxides of nitrogen (NO_x) (air pollutants that have significant adverse impacts on human health) and of carbon dioxide (CO_2) (a greenhouse gas that is involved in the regulation of the earth's climate) from vehicle exhausts in Central London 20mph and 30mph environments. (It also estimates (using

[10] *An Evaluation of the Air Quality Impacts of a 20mph Speed Restriction in Central London*, Transport and Environmental Analysis Group, Centre for Transport Studies, Imperial College London, April 2013

other data) the likely emissions of brake and tyre wear for driving the same test routes.)

34. The study concludes that:

    The effects of a 20mph restriction … were shown to be mixed, with particular benefit seen for emissions of particulate matter and for diesel vehicles. The methodology was validated by consideration of real-world tailpipe emissions test data. It was therefore concluded that air quality is unlikely to be made worse as a result of 20mph speed limits on streets in London.[11]

Likely Changes in Emissions as a Result of Modal Shifts

35. As discussed *above*, this report assumes no modal shift to walking, because of the existing very high levels of walking in the City, but a significant (although unquantified) modal shift to cycling as a result of the implementation of a 20mph environment in the City. However, this is unlikely to have much impact on air quality as most new cyclists in the City will be switching from public transport rather than from cars.

LIKELY CHANGES IN THE EMISSIONS OF AIR POLLUTANTS FROM ROAD VEHICLE BRAKE AND TYRE WEAR, INCLUDING AS A RESULT OF MODAL SHIFTS

Likely Changes in the Emissions of Air Pollutants

36. The 2004 European Commission study *Particulates—Characterisation of Exhaust Particulate Emissions from Road Vehicles: (8) Measurement of non-exhaust particulate matter* demonstrated the relationship whereby when average speeds are lower, brake and tyre emissions are also lower. This is because lower average speeds reduce the proportion of time that vehicles spend accelerating and decelerating compared to moving at their cruising speed.

37. The Imperial College London study[12] confirmed that this result from the European Commission study is true in the real-world driving conditions of Central London.

---

[11] Executive Summary, Project Findings, p. 8

[12] *An Evaluation of the Air Quality Impacts of a 20mph Speed Restriction in Central London*, Transport and Environmental Analysis Group, Centre for Transport Studies, Imperial College London, April 2013

Likely Changes in Emissions as a Result of Modal Shifts

38. Changes in the emissions of air pollutants from road vehicle brake and tyre wear are also likely to occur as a result of modal shifts. As discussed *above*, this report assumes no modal shift to walking, because of the existing very high levels of walking in the City, but a significant (although unquantified) modal shift to cycling as a result of the implementation of a 20mph environment in the City. However, this is unlikely to have much impact on air quality as most new cyclists in the City will be switching from public transport rather than from cars.

LIKELY CHANGES IN NOISE POLLUTANTS AND EXCESSIVE VIBRATION FROM ROAD TRAFFIC, INCLUDING AS A RESULT OF MODAL SHIFTS

39. In *The Speed Limit Appraisal Tool: User Guidance*[13], which was published by the Department for Transport alongside Circular 01/2013, *Setting Local Speed Limits*, it is observed that "even in the most extreme cases, the change in noise levels as a result of speed limit changes is likely to be negligible (<1dBA)"[14]. As a result, your officers have concluded that it would not be good value for money to attempt to quantify likely changes in noise pollutants and vibration from road traffic (including as a result of modal shifts) and this report therefore assumes that there will be no significant changes in noise or vibration as a result of a change to a 20mph environment in the City.

[13] Department for Transport, January 2013
[14] Annex A: Development of Relationships, paragraph A.58, p. 92

SUMMARY OF PREDICTED IMPACTS

40. Tables 1 and 2 *below* summarise the predicted impacts set out in the sections *above* for ease of reference.

Table 1: Categorisation of Non-Quantifiable Impacts

Categorisation of Likely Impacts	Depiction
unquantified but strongly positive	+ +
unquantified but significant and positive	+
unquantified but insignificant or neutral	——
unquantified but significant and negative	–
unquantified but strongly negative	– –

Table 2: Summary of Predicted Impacts

Factor	Likely Impact
casualties	a reduction in road traffic casualties of 8.6% (i.e., a reduction from 1 228 to 1 122.5 over three years)
average journey times	up to a 10% increase in average journey times
walking environment	+ +
cycling environment	+ +
modal shift to walking	——
modal shift to cycling	+ +
air pollution (exhaust emissions)	——
greenhouse gas emissions	——
air pollution (brake and tyre wear)	+
emissions—modal shift to walking	——
emissions—modal shift to cycling	——
noise pollution and vibration	——

SPEED LIMIT APPRAISAL TOOL

41. Along with Circular 01/2013, *Setting Local Speed Limits*, the Department for Transport has published a speed limit appraisal tool[15] to assist traffic authorities in assessing the costs and benefits of proposed local speed limit schemes. Your officers have downloaded and run this speed limit appraisal tool using City and Transport for London data; the outputs from this use of the tool confirm that the benefits of a City-wide 20mph environment would significantly outweigh the costs. However, the figures and results that this report sets out are not the outputs from the speed limit appraisal tool. The speed limit appraisal tool is designed for use nationally, to estimate the costs and benefits of virtually any change in speed limit (e.g., increasing the speed limit on a rural dual carriageway to 70mph) and it does not seem to cope particularly well with realistically estimating the costs and benefits in congested urban conditions such as the City. In particular, your officers consider that, in the City's context, the speed limit appraisal tool overstates the likely casualty savings from implementation of a 20mph environment, and have therefore included more conservative casualty saving figures in this report; but that the tool incorrectly estimates a negative impact on air quality and emissions of greenhouse gases, whereas the London-specific research by Imperial College London demonstrates that a neutral impact on emissions from exhausts and a positive reduction in emissions from brake and tyre wear is much more likely.

42. To summarise, the figures and results that this report sets out do not derive from use of the Department for Transport's speed limit appraisal tool; nevertheless, the tool has been run using local data and the outputs confirm that the benefits of a City-wide 20mph environment would significantly outweigh the costs.

TRANSPORT FOR LONDON ROAD NETWORK

43. In accordance with the brief for this investigation contained within the Local Implementation Plan, Transport for London has been consulted about the possibility of including some or all of the streets in the City for which that authority is the local traffic authority ("the Transport for London road network") in any City 20mph environment. On 8 April 2013 Transport for London formally responded to say that it is, in principle, supportive of *all* of the Transport for London road network in the City being included within any City 20mph environment.

[15] https://www.gov.uk/government/publications/speed-limit-appraisal-tool

44. In particular, Transport for London's response notes that:—

> *TfL recognises the evidence that speed is a factor in road danger and 20mph limits can contribute to reducing collisions and the severity of casualties. As such TfL is supportive of the City's proposals. The recently published Mayor's Cycling Vision states:*
>
> "We will take a case-by-case approach to the use of 20mph limits on the TLRN and we will reduce the speed limit to 20mph at several locations on the TLRN where cycle improvements are planned."

45. The Transport for London response notes one caveat, which is that the Mayor of London's proposal for a West London–Barking "Crossrail for the bike", which is to run along the A3211[16], may or may not be suitable for inclusion within a City 20mph environment, depending on the level of segregation of cyclists from motor vehicles that is achieved by the detailed design of this proposed new major cycling facility. The Mayor's *Vision for Cycling* notes that "We will segregate where possible, though elsewhere we will seek other ways to deliver safe and attractive cycle routes"[17]. In other words, if the A3211 cycle facilities are fully segregated, Transport for London may not be supportive of a 20mph speed limit on this route, as the road danger reduction benefits would be partially achieved in other ways. However, this caveat relates only to the A3211, and the in principle support for all of the Transport for London road network in the City being included within any City 20mph environment would be unchanged by this outcome of the detailed design of the Mayor's "Crossrail for the bike" proposal.

46. As Transport for London is the local traffic authority for the whole of Victoria Embankment (within both the City of London and the City of Westminster), that authority could set a consistent speed environment for the whole of the A3211[18] (whether that is 20mph or 30mph) without any incongruous change in speed environment at the City's western boundary.

SPEED LIMITS OF NEIGHBOURING AREAS IN THE LONDON BOROUGHS

47. There is a variety of speed limits in the areas immediately surrounding the City, but the majority of adjoining areas are either already a 20mph

[16] In the City the A3211 is Victoria Embankment–Blackfriars Underpass–Upper Thames Street–Lower Thames Street–Byward Street.
[17] *The Mayor's Vision for Cycling in London: An Olympic Legacy for all Londoners*, "A Tube Network for the Bike", p. 10
[18] Victoria Embankment–Blackfriars Underpass–Upper Thames Street–Lower Thames Street–Byward Street–Tower Hill

environment or are the subject of a resolution by the relevant London borough that the speed limit should be 20mph.

48. The **City of Westminster** is principally a 30mph speed limit area.

49. Many of the streets in the **London Borough of Camden** adjoining the City (e.g., Hatton Garden and Saffron Hill) are 20mph. The borough is currently consulting publicly on converting all of its streets to 20mph.

50. The majority of streets in the **London Borough of Islington**, including the majority adjacent to the City, are subject to a 20mph speed limit or are part of a 20mph zone. The borough is in the process of converting the main roads in its control (such as City Road, Finsbury Pavement and Goswell Road) to a 20mph speed limit; once this is complete, all streets for which the London Borough of Islington is the local traffic authority will be 20mph.

51. The majority of streets in the **London Borough of Hackney**, including the majority adjacent to the City, are 20mph, with a few main roads excepted.

52. The majority of the Spitalfields and Whitechapel districts of the **London Borough of Tower Hamlets** are 20mph, although currently the streets between the boundary with the City and Commercial Street/Leman Street are 30 mph. Commercial Street and Leman Street form parts of the London inner ring road and a natural north–south boundary within Spitalfields and Whitechapel. If the City was to change to a 20mph environment the London Borough of Tower Hamlets would likely take the opportunity to review the speed limit of this remaining small 30mph area between the City boundary and the inner ring road to ensure a consistent speed environment within Spitalfields and Whitechapel.

53. Many of the streets in the **London Borough of Southwark** close to the City (e.g., Tower Bridge Road and Upper Ground) are 20mph. The borough has recently adopted a policy that all of the streets for which it is the local traffic authority will be converted to 20mph (where they are not already).

INTERNATIONAL EXAMPLES

54. It is instructive to observe what is happening in London's international peer cities in relation to inner-city 20mph or 30km/h speed limits. **New York** has been instituting 20mph zones in residential areas for some time, and is now expanding this programme to some inner city areas, including on

Manhattan (e.g., Inwood), with Mayor Michael Bloomberg and Transportation Commissioner Janette Sadik-Khan announcing in July 2012 the creation of a further 13 "safe zones", an initiative that includes reducing the speed limit from 30mph to 20mph. **Paris** is significantly expanding the number, size and reach of 30km/h zones within the Boulevard Périphérique (roughly equivalent to the North and South Circulars in London terms). In **Tokyo** the default speed limit on main streets is 40km/h (24.9mph) and on side streets 30km/h (18.6mph).

WORLD HEALTH ORGANIZATION ENDORSEMENT

55. The World Health Organization has recently published its good practice manual *Pedestrian Safety: A Road Safety Manual for Decision-Makers and Practitioners*[19] (Geneva, Switzerland: World Health Organization, 2013). The manual is endorsed by the FIA Foundation for the Automobile and Society, the Global Road Safety Partnership and the World Bank.

56. The manual sets out that "One of the most effective ways to improve pedestrian safety is to reduce the speed of vehicles…. … speed is a key risk factor for pedestrian traffic injury" (p. 75) and categorises the intervention of "Implement area-wide lower speed limit programmes, for example, 30km/h" [20mph] as "Proven" in its effectiveness in reducing fatalities and injuries (pp. 63–64).

57. Modal shifting to cycling and walking would result in public health benefits, which are particularly relevant to the City now that the public health duty rests with local authorities.

ENFORCEMENT AND POLICING

58. During the 2012 calendar year 2 145 drivers of motor vehicles were identified as having committed an offence by driving in excess of the speed limit on a City street. Of these, 2 049 offences were detected by the Gatso speed cameras on Upper Thames Street and Lower Thames Street and 96 offences were identified on other City streets.

59. The City of London Police support the introduction of a 20mph speed limit for the City. In reviewing the practicalities of implementation, the Commissioner of Police has noted that the existing speed cameras in the City (on Upper Thames Street and Lower Thames Street) are not suitable for the enforcement of 20mph speed restrictions and therefore that, if any

[19] http://apps.who.int/iris/bitstream/10665/79753/1/9789241505352_eng.pdf

20mph speed limit is not successful in being self enforcing, there may be a need for additional enforcement resources (for new speed cameras on the A3211 and, potentially, additional back-office penalty charge notice processing). The provision of resources to address the need for new speed cameras is a specific action for Transport for London set out in the recent Mayor's *Safe Streets for London* action plan.

EDUCATION AND BEHAVIOUR CHANGE

60. It would seem appropriate that any 20mph environment that may be introduced be accompanied by an extensive behaviour change (publicity) campaign to increase compliance with the new speed limit and to maximise the scheme's benefits. Road users are more likely to comply with a speed limit when they understand the reasons for it and the benefits of doing so.

20MPH SPEED LIMITS AND 20MPH ZONES

61. **20mph speed limits** are prohibitions on driving motor vehicles at more than 20mph made by order under the Road Traffic Regulation Act 1984. They must be signed with terminal signs (signs placed to indicate the beginning of the speed limit) and at least one repeater sign along each street that is subject to the 20mph speed limit[20] unless it is shorter than 200 metres[21]. Traffic authorities must ensure that there are sufficient repeater signs within the area of the 20mph speed limit to inform road users of the limit.

62. Traffic calming features may be used within 20mph speed limits to help to achieve compliance with the limit, but they are optional. *Setting Local Speed Limits* notes that "If the mean speed is already at or below 24mph on a road, introducing a 20mph speed limit through signing alone is likely to lead to general compliance with the new speed limit"[22], i.e., traffic calming features are unlikely to be necessary where mean speeds are already at or below 24mph.

63. **20mph zones** are zones that are subject to prohibitions on driving motor vehicles at more than 20mph made by order under the Road Traffic Regulation Act 1984. They must be signed with signs indicating the

[20] Direction 11(2) of the Traffic Signs General Directions 2002, as amended by Direction 8(3) of the Traffic Signs (Amendment) (No. 2) General Directions 2011
[21] Direction 11(2E)(a) of the Traffic Signs General Directions 2002, as amended by Direction 8(4) of the Traffic Signs (Amendment) (No. 2) General Directions 2011
[22] paragraph 95

20mph zone at each entrance for vehicular traffic[23], and, with the exception of culs-de-sac less than 80 metres long, no point within the zone must be further than 50 metres from a 20mph sign or a 20mph road marking or a traffic calming feature[24].

64. Although there is a general expectation that 20mph zones will contain traffic calming features and 20mph speed limits will not, in fact the government's reforms in 2011 introduced very significant flexibility and now both 20mph options can be introduced using only traffic signs (including road markings). However, 20mph speed limits and 20mph zones may both contain traffic calming features if the traffic authority wishes to introduce them to help to achieve compliance but in both options traffic calming features are optional. The only remaining necessary distinction between 20mph speed limits and 20mph zones is the different terminal (entrance) signs.

OPTIONAL TRAFFIC CALMING FEATURES

65. Traffic calming features are optional in both 20mph speed limits and 20mph zones.

66. Traffic calming features do not have to be road humps; they can also include:

- refuges for pedestrians that are so constructed as to encourage a reduction in the speed of traffic using the carriageway;

- variations of the relative widths of the carriageway and any footway that has the effect of reducing the width of the carriageway and is carried out for the purpose of encouraging a reduction in the speed of traffic using the carriageway;

- horizontal bends in the carriageway through which all vehicular traffic has to change direction by no less than 70 degrees within a distance of 32 metres as measured at the inner kerb radius; and

[23] Direction 11(3)(a) of the Traffic Signs General Directions 2002, as amended by Direction 8(5) of the Traffic Signs (Amendment) (No. 2) General Directions 2011
[24] The Secretary of State for Transport's Special Direction 2 of 17 October 2011

- other traffic calming works such as build-outs, chicanes, gateways, islands, overrun areas, pinch points, rumble devices or any combination of such works[25].

67. The City already has very many pedestrian refuges, islands, carriageway and footway width variations and horizontal bends in its streets. Any possible consideration of traffic calming features therefore need not involve any road humps or any other particular features; and all traffic calming features are in any event optional and are not required for either a 20mph speed limit or a 20mph zone.

[25] Direction (16)(2) of the Traffic Signs General Directions 2002 and Regulation 3 of the Highways (Traffic Calming) Regulations 1999