

Date: 24 February 2022

Item: Bus Safety Programme

This paper will be considered in public

1 Summary

1.1 This paper provides an update on the progress of the delivery of the Bus Safety Programme.

2 Recommendation

2.1 **The Panel is asked to note the paper.**

3 Background

3.1 The Mayor and TfL have adopted Vision Zero for London, with a target of zero deaths or serious injuries from road collisions by 2041.

3.2 Within Bus Operations, we have even more ambitious targets:

- (a) 70 per cent reduction in the number of people killed or seriously injured in, or by, buses by 2022 (against 2005-09 baseline); and
- (b) No one killed in, or by, a bus by 2030.

3.3 The Bus Safety Programme was launched in February 2016, with the aim of reducing the number of people killed or seriously injured (KSI) on the bus network.

3.4 The number of people killed or seriously injured in or by a bus fell by 37 per cent to 132 people between 2019 and 2020, which is the lowest number on record. This is 78 per cent down on the 2005-09 baseline. This means that we met our 2022 target two years early. However, this achievement should be considered in light of the changes to travel patterns, fewer bus journeys and bus patronage as a result of the coronavirus pandemic restrictions. The injury risk rate for injuries arising from collisions involving buses has risen during 2021, so it is unlikely that this reduction in casualties will have been maintained in 2021, as London continues to recover from the effects of the pandemic. There is also some uncertainty about residual or permanent travel pattern and behaviour change as we go forwards, that may impact upon our continual improvement in bus safety and there is still more to do if we are going to reach our 2030 target.

- 3.5 The Bus Safety Programme is aligned with the Vision Zero ‘safe systems’ approach which aims to ensure safe speeds, safe streets, safe behaviours and safe vehicles. Progress against each area is detailed in this paper.

4 Safe Speeds

Intelligent Speed Assistance (ISA)

- 4.1 Intelligent Speed Assistance (ISA) technology, which ensures compliance with speed limits, is a key part of the Bus Safety Standard (BSS). ISA uses GPS-linked speed limit data to advise the driver of the current speed limit and automatically limits the speed of the vehicle as necessary. There are currently just under 1,900 ISA enabled buses out of a total fleet of 9,000 in London, including 634 new vehicles that also meet the 2019 BSS.

ISA Retrofit

- 4.2 The retrofit roll-out of ISA began in summer 2021, after delays due to the coronavirus pandemic. In total around 3,000 buses are in scope for the retrofit programme and to date around 500 have been retrofitted. However, owing to funding uncertainties the ISA retrofit programme currently only has funding for a further 700 buses, after which the programme will be paused. Once funding is released this programme can re-start but completion will be delayed reflecting the impact of funding uncertainty on the supply chain and the necessary pre-ordering of parts. The widely reported global issues of electronics component supply has also impacted on this workstream.

Speed Compliance Tool

- 4.3 As an interim solution to reducing London bus speeds while ISA is rolled out, a Speed Compliance Tool has been developed which monitors bus speeds across London. The Tool has been provided to all bus operators and is being used proactively to analyse the performance of their bus routes and as supporting evidence when concerns around speeding vehicles are raised.
- 4.4 The Speed Compliance Tool has received positive feedback from bus operators in relation to the accuracy of recorded speeding events. This means that bus operators can confidently use the Tool to proactively address speed compliance within their operations. We are currently further developing the Tool to enable more proactive analysis of trends and to identify hotspot locations on the network where buses are driving in excess of the speed limit, and provide that data to the relevant bus operator to take action.

Benefits Realisation

- 4.5 There is an increasing number of BSS compliant buses in the fleet, with over 600 buses that now meet the 2019 or 2021 BSS requirements. With this increasing number of BSS compliant buses, benefits realisation work is underway to understand the effectiveness of BSS measures in achieving the forecast safety benefits. For instance, whether the fitment of ISA has reduced speeding and the number of incidents where speed is a factor, and whether buses with Camera Monitoring Systems (CMS) in place of conventional wing mirrors are involved in fewer collisions with vehicles/objects to the side of the bus.

- 4.6 The benefits realisation work will include the development of a central database to track and review incidents with buses that meet the BSS requirements compared with buses without.

5 Safe Streets

Pedestrian behaviour and risk management

- 5.1 In 2019, TfL appointed Integrated Transport Planning Limited (ITP) to conduct research into pedestrian behaviour and risk management. Unfortunately, most deaths and serious injuries arising from collisions involving buses are caused to pedestrians. Therefore, looking at ways to reduce collisions with pedestrians is a priority for the Bus Safety Programme. The research aimed to help better understand pedestrian behaviour in relation to specific types of street infrastructure and the potential for light-touch engineering and technological solutions to help prompt people to reduce their exposure to road danger while walking in London. The final report was completed in March 2020.
- 5.2 A technical research group is being established to take forward the findings in the report. This group will further examine the report's findings for opportunities to improve processes and guidance and will aim to develop interventions to trial on street, including interventions to improve safety at contraflow bus lanes.
- 5.3 We are continuing to look for opportunities to enhance the knowledge base of infrastructure scheme development teams to prioritise bus safety considerations in early scheme development.

6 Safe Behaviour

Destination Zero Bus Driver Training

- 6.1 Delivery of 'Destination Zero', the safety training programme for London bus drivers, commenced in May 2019. The training course uses innovative virtual reality technology, which is designed to make the course engaging and impactful. Extensive filming took place in London so that participants on the training course can experience a wide range of scenarios that drivers in London may encounter. The training covers hazard perception, hazard prediction, judgement, and driver wellbeing.
- 6.2 Training delivery has been severely impacted by the coronavirus pandemic with suspensions during all lockdowns and time taken to ensure COVID-safe delivery, including the procurement of surgical-grade cleaning equipment for the virtual reality headsets.
- 6.3 As of December 2021, 11,067 drivers had been trained. Of this number, 94 per cent of delegates have rated the course as good or excellent, with 98 per cent of drivers rating it as 'useful' or 'extremely useful' in their day-to-day role. In addition, 94 per cent would recommend Destination Zero to a colleague.
- 6.4 Three operators have completed the training. However, overall completion remains low due to driver availability, coronavirus restrictions and training regulations that have impacted the number of courses that operators have

capacity to deliver. We will investigate potential solutions with bus operators with the aim of increasing delegate numbers and ensuring we maximise the number of drivers completing the course this year.

- 6.5 We have commissioned an independent evaluation of the long-term impact of the training.

Fatigue Risk Management Systems

- 6.6 All ten operators have a Fatigue Risk Management System (FRMS) which follow good practice. These detail how each operator will manage fatigue, using tools including training, roster assessment, best practice in investigation and innovative technologies. These documents should be viewed as 'live' documents that evolve and are regularly reviewed in conjunction with TfL as we learn more about managing fatigue and introduce new measures to the fatigue management programme. The latest updates on the programme are below.

Fatigue Management Awareness Training for Managers

- 6.7 Fatigue Management Awareness Training for Bus Operators has been completed by around 1,800 managers and supervisors across all ten bus operators. This training aimed to upskill front line managers and supervisors to provide the information and tools managers need to promote an open culture and have open and honest discussions around fatigue with their staff.
- 6.8 Actions committed to by delegates at the end of the training were recorded and included in an evaluation of the training. Most actions were centred around communication and management including actions to support an open culture, being more observant, asking more questions, raising awareness and sharing information. The training evaluation found that most people felt that after completing the training their understanding of fatigue management had improved and that they felt more confident to investigate incidents that may be related to fatigue.
- 6.9 The Fatigue Working Group which includes representatives from bus operators are now developing a follow up plan to further strengthen training and communication of fatigue.

Fatigue Detection Technology

- 6.10 Subject to funding, TfL will be working with all ten bus operating companies, their drivers and local union representatives to fit around 450 buses with fatigue detection technology. This will support the bus operators in understanding the scale of the fatigue problem within their own operations, and to develop their company culture and processes further to successfully manage bus driver fatigue. Once fitted, there will be a 12-18 month period of data collection and analysis which will further inform the wider bus driver fatigue programme and any further roll out of fatigue detection technology. However the installation has been paused (at the time of writing) due to the current funding position.
- 6.11 This project is ready to commission independent consultancy support to assist bus operators in technology fitment, analyse the data collected for trends through

which recommendations can be actioned, gather technical and operational data on the range of currently available fatigue detection tools, and to build a business case for the potential future roll out of this technology onto London's bus fleet.

Fatigue Risk Assessment Tool

- 6.12 One of our commitments to address fatigue amongst bus drivers was to review available roster tools that purport to identify higher risk shift patterns and therefore make changes to drivers shift allocation. In July 2021, we commissioned the University of Surrey to undertake this work. The main aim of this research is to support TfL and bus operators in understanding the suitability, limitations and potential for using existing fatigue and/or risk assessment scheduling and rostering tools. It also provides an opportunity to develop improved guidance for the use of such tools within the bus industry and across other TfL operational areas.
- 6.13 The University of Surrey has engaged with bus operators to better understand their requirements for a Fatigue Risk Assessment Tool. It researched available tools across the industry in order to determine whether there was a solution readily available on the market, or one that could be adapted in order to have the potential to meet bus operator requirements. The University of Surrey is now carrying out validation checks using real world data from known fatigue incidents identified through fatigue detection technology installed on a small number of buses. This is due to be completed in February 2022 and the outcome will determine the next steps of this workstream.

7 Safe Vehicles

Bus Safety Standard

- 7.1 The BSS is being rolled out against the published Roadmap. Around 630 new buses meet the standard. The focus is on supporting the delivery of new buses that meet our standard and looking ahead at changes from 2024 onwards, either adding to the existing roadmap or stretching the roadmap to encompass 2027 and 2030. Any changes or additions to the roadmap will be evidence-based, take account of the projected benefits from the existing measures included, take account of regulatory changes, and will include issues arising among bus occupants resulting in slight injuries.
- 7.2 The roll out of these features is driven primarily by new buses. Our modelling has been based on a maintained fleet size of about 9,000 buses being renewed on an ongoing basis. Scenarios where the fleet size reduces will slow the numbers of new buses entering the fleet, which will delay the benefits of those features. Whilst retrofitting is possible (see paragraph 7.16), it is not always as effective as installation at new, and is typically more expensive.

Bus Safety Standard 2019

- 7.3 Since May 2019, new buses entering the fleet must meet the requirements of the Bus Safety Standard (2019). Safety measures include ISA technology to limit the buses speed to the posted speed limit, Acoustic Vehicle Alerting Systems (AVAS) for quiet-running buses only (around 500 buses to date) to alert vulnerable road

users to the bus, blind spot wing mirrors to improve visibility in known blind spots, and non-slip flooring of a higher resistance than is usually required to reflect the additional risk of being on a moving vehicle.

Bus Safety Standard 2021

- 7.4 Since last summer, new buses must also meet the requirements of the Bus Safety Standard 2021 roadmap (which are additional to those required in 2019). Safety measures include CMS replacing wing mirrors, improvements to the internal design of buses to reduce risk factors for passengers, changes to the braking system to prevent buses from rolling away without drivers in the cab, and 'brake toggling' to reassert good driver position and pedal awareness to reduce incidents of pedal confusion.

Bus Safety Standard 2024

- 7.5 From 2024, all new buses entering the London bus fleet must have additional safety features to those required under BSS 2019 and BSS 2021. The requirements for new buses in 2024 are: Advanced Emergency Braking (AEB); enhanced indirect vision/ the Bus Vision Standard; front and nearside vulnerable road user (VRU) detection systems; optimised geometry and energy absorption; (redesigning the front of the bus to reduce the severity of an impact); Level 2 occupant friendly interiors.
- 7.6 Work is currently underway to help bus manufacturers achieve these ambitious safety measures, including on AEB, front and nearside vulnerable road user detection systems and energy absorption of the front of the bus to mitigate the severity of injury should pedestrians or cyclists be in a collision with the bus. AEB is the most challenging safety measure to introduce on buses and TfL has dedicated resource to focus on getting it right.

BSS Development

Advanced Emergency Braking (AEB)

- 7.7 AEB is a driver assist system intended to help a driver avoid or mitigate the severity of collisions. The system works by initially warning the driver of a risk of collision and giving the driver the opportunity to respond. In the situation where the driver does not react, or the time to collision is too short, the brakes are then automatically applied to reduce speed. AEB is the single biggest bus vehicle technology contributor to achieving vision zero, with potential to prevent up to around 25 per cent of pedestrian fatalities from collisions involving buses. AEB is a requirement for new London buses entering the fleet in 2024 as part of the Bus Safety Standard.
- 7.8 Work is underway to ensure that AEB systems can be developed for London buses by 2024 that deliver the expected strong safety benefits. This work has included a Bus Braking Analysis Research project, engagement with the bus industry, development of options for TfL to help support delivery of AEB, cost benefit analysis and an updated Business Case. The current TfL funding position means that we have had to pause the next stages of research and development

of AEB, and unless funding is approved this month it is very likely that introduction of AEB will have to be delayed beyond 2024.

Vulnerable Road User (VRU) Detection Technology

- 7.9 TfL and its stakeholders seek to understand the benefits of VRU detection technology as a solution for use by London bus operators across the TfL bus fleet. An independent evaluation of a trial of VRU detection technology was commissioned by TfL in August 2021, with the aim of better understanding the technology limitations, and whether these systems act purely as a preventative measure or also act as a bus driver coaching tool. The results of the trial are expected later in 2022.

Bus Driver Collision Restraint Systems

- 7.10 Following the Orpington bus collision on October 2019 (in which a bus driver tragically died whilst driving his bus in a multiple vehicle accident), TfL has commissioned work to understand the evidence-base for introducing driver collision restraint systems, such as seat belts, to the BSS. This project will analyse collision data from the Metropolitan Police, and from our IRIS database, to understand and prioritise opportunities for the implementation of driver restraint systems relative to relevant bus collision scenarios.

BSS Compliance Monitoring

- 7.11 A programme of independent checks, Engineering Quality Management (EQM), are randomly undertaken on a proportion of buses in the London bus fleet throughout the year. When issues are found these are reported back to the bus operator and TfL for remedial action and oversight. Recently work has completed to extend this existing process to include the safety measures specified in the BSS into this rolling programme of compliance and assurance monitoring. These additional checks will be included in the EQM, subject to available funding.

AVAS

- 7.12 TfL developed an AVAS for its buses that goes above the requirements of UN Economic Commission for Europe Regulation 138, which requires AVAS on all new vehicles. This included developing a bespoke AVAS sound, the Urban Bus Sound, which is licensed for use outside London but is restricted to being used only on buses.
- 7.13 In the spirit of achieving Vision Zero, TfL's bus AVAS includes extra features to achieve maximum safety benefits, given a bus service is very different from other vehicles that the generic legislation included. TfL bus AVAS requires the use of the Urban Bus Sound to ensure all buses in London use the same consistent sound to assist identification of a vehicle being a bus, includes the sound being played when the bus is stationary (such as at a bus stop or waiting in traffic), and a directionality feature within the sound to assist vision-impaired people in locating and understanding how the bus is moving.
- 7.14 Despite significant delays due to coronavirus restrictions, TfL's bus AVAS has been further developed to create 'responsive AVAS'. Responsive AVAS enables

the volume of the Urban Bus Sound to change in response to ambient noise levels using pre-determined levels that are combined with the TfL Digital Speed Limit Map to allow geolocation of the bus. For example, the volume increases when travelling through busy areas and reduces when travelling through quiet residential areas. Bus route 100 and a small number of buses across three other bus routes have been upgraded to responsive AVAS for the trial. This work will be completed by March 2022 and next steps will be determined for the roll out of responsive AVAS on both new and retrofitted vehicles.

Pedal Confusion

- 7.15 Pedal confusion research continues to progress, and a draft report is being reviewed. Next steps will involve putting together a prioritised list of practical solutions and actions based upon recommendations from the report, which will be explored in conjunction with TfL Engineering to determine validity and complexion of implementation. An action plan will be developed and managed by a Pedal Confusion working group, which will launch once the report had been finalised.

Bus Safety Standard Retrofit Projects

- 7.16 The roll out of the BSS through new buses is limited to the bus renewal cycle. While the push for electrification of the bus fleet may escalate this renewal, there is more we can do to improve safety now and in the shorter-term. Retrofitting selected safety measures will bring quicker benefit realisation and means that it is possible to target safety measures more quickly to those buses or routes that need them.
- 7.17 In addition to ISA, there are three further safety measures that are being explored for potential retrofit programmes – AVAS, CMS and fatigue detection technology.
- 7.18 Currently, there are around 500 new buses with AVAS, but TfL has many electric, hydrogen and hybrid vehicles in the fleet that could also have the benefit of AVAS. Buses in London are expected to remain in the fleet for approximately 14 years meaning that, without action to retrofit AVAS to all pre-BSS 2019 buses, it could take to 2034 for buses without AVAS to be replaced. Feasibility work is currently underway to finalise the buses in scope to be retrofitted. This has included a Market Sounding Questionnaire (MSQ) to suppliers of AVAS systems to inform a procurement strategy and cost benefit analysis. This work will be completed in the spring but the project has now been paused due to funding uncertainty. Once funding is released the rollout of retrofitted AVAS could be expected from 2023.
- 7.19 CMS improve direct and indirect vision for the driver by reducing blind spots and improving hazard perception. All new buses entering our contracts from 2021 are required to have CMS. Some manufacturers are already able to offer this as an option to bus operators and currently around 540 new buses have CMS fitted. Outcome definition work has been completed but owing to pandemic-related financial pressures bus operators have not been able to commit their own funds to retrofitting CMS with match funding from TfL as originally envisioned. An alternative strategy is now being developed for the roll out of retrofitted CMS, however owing to funding uncertainties for the operators and TfL no retrofitting can be committed to at the present time.

7.20 Fatigue detection technology is the last opportunity for intervention before a fatigue-induced collision may occur. On its own it does not solve bus driver fatigue, but it forms a key part of TfL's and bus operator's fatigue management programme. Any further roll out of this technology will be informed by the 12-18-month cross-operator project referred to in Paragraph 6.10.

8 Driver Health and Wellbeing

8.1 The University College London research into bus driver Covid-19 deaths highlighted the need to be more proactive in understanding existing health conditions of bus drivers, supporting better health and identifying those most at risk. The findings were:

- (a) Many bus drivers were at increased risk of COVID-19 due to their older age profile, male sex, and higher proportion of employees of Black and Asian minority ethnicity, residence in more deprived areas and pre-existing health conditions such as hypertension, diabetes and cardiovascular disease.
- (b) 31 per cent of drivers who took part in the study aged 20 to 44 are overweight.
- (c) Drivers in the study were more likely to be obese at a younger age than the general population.
- (d) There is some evidence of earlier onset of some pre-existing conditions.

8.2 A bus driver Health and Wellbeing Programme is being developed by the Health and Wellbeing Working Group, which includes representatives from London bus operators and TfL's Occupational Health team. The initial priority of the working group has been to establish a health assessment offering for bus drivers based on bus operator organisational requirements. The high-level data collected will be routinely evaluated through established methodologies to identify any trends and allow targeted interventions to be put in place.

Health Kiosks

8.3 TfL will support bus drivers through the provision of self-service health assessment kiosks or comparable health assessment across all ten bus operating companies. The rollout of these health assessments to bus drivers began during winter 2021/22. TfL will collect aggregated data to define and inform further activities for the Bus Driver Health and Wellbeing Programme.

Employer Health Innovation Fund

8.4 The Impact on Urban Health and Design Council have offered TfL a grant of £110,000 to deliver health and wellbeing assessments of bus drivers. The Fund will be used to identify user insights and opportunities for bus operators to meet the health and wellbeing needs of drivers and provide recommendations to improve or enhance existing standardised health assessment offers and initiatives. The study began in September 2021 and, as part of this, individual interviews with drivers and bus operator staff across four companies have been

conducted. The Employer Health Innovation Fund is funded by Impact on Urban Health and delivered by Design Council.

- 8.5 TfL will continue working with the Design Councils and bus operators to deliver health assessments to operators that currently don't use them. This will involve utilising insight gathered from the research exercise for their implementation and management. A broader piece of work will concurrently begin on researching the broader non-clinical services to establish a working definition for 'assessments' and 'wellbeing checks'.

Fatigue, Health and Wellbeing Innovation Challenge

- 8.6 The combined Fatigue, Health and Wellbeing Innovation Challenge was launched in late spring 2021 and over 50 companies responded with solutions. The challenge will enable us to trial a number of measures across London bus operators that will help to reduce fatigue and improve health and wellbeing of bus drivers. There was a total of ten successful bids with eight London bus operators benefitting which includes three bids from partnerships between operators.
- 8.7 The projects will provide TfL and bus operators with:
- (a) independent evaluation of leading market innovations and how they can help the London bus industry;
 - (b) evidence of whether specific measures can help to reduce bus driver fatigue and/or improve bus driver health and wellbeing;
 - (c) guidance on how to roll out the measures, where suitable, and any risks, issues, and opportunities in deployment; and
 - (d) tangible benefits and results for the drivers included in the trials.
- 8.8 The process for the Fatigue, Health and Wellbeing Innovation Challenge has been paused at the time of writing due to funding uncertainty. We continue to work with bus operators and suppliers of the successful bids to ensure robust project management of the bids and programme management of the whole Innovation Challenge is ready once funding is released.

9 Emerging Issues

Slips, Trips and Falls

- 9.1 Non-collision incidents are often defined as events where either the bus is stationary and bus passengers slip, trip or fall whilst boarding or alighting the bus, or when a bus is moving and bus passengers on board slip, trip or fall, often as a result of acceleration, braking or manoeuvres. Whilst slips, trips and falls are often, but not always, less severe in their consequences than collisions, there are a large number of non-collision events on public buses. TfL has been analysing the data on slips, trips and falls, taking a holistic and strategic view of what we know about slips, trips and falls, target improvements to prevent them and identify what more we could do.

9.2 The coronavirus pandemic has also had a more recent impact on the customer injury rate on buses, for which slips, trips and falls account for a large proportion. Potential contributory factors driving this increased risk include:

- (a) our customers' pandemic-related behaviours and attitudes around not holding onto bus fixtures and fittings such as handrails remain in place;
- (b) growing confidence amongst older customers to return to the bus network, who we know are more likely to be involved in fall events and are more vulnerable to serious injury;
- (c) re-opening of hospitality means more people travelling to restaurants, pubs and bars which are now open, we are likely to see more intoxicated customers on our network, compared to mostly essential travel purposes during the pandemic. It is noted however, that this may have a greater effect on other modes such as London Underground;
- (d) growth in people walking and cycling as a result of the coronavirus pandemic may be creating more interactions between buses and other road users, and therefore more incidents of harsh braking, where preventing injury to another road user may have a knock-on impact to customers travelling on the bus; and
- (e) car-led recovery and mode switch from public transport to car, means there are likely to be new drivers less used to driving in London. Some bus operators have suggested this could be leading to increased conflict between third-party drivers and buses.

9.3 Further analysis is still underway and existing and new measures are being identified to address the problem of slips, trips and falls. There are measures already included in the BSS which will help, such as:

- (a) higher grade of slip resistant flooring;
- (b) occupant-friendly interiors (BSS 2021 and 2024) requirements;
- (c) AVAS, which should reduce the need for sudden evasive action by bus drivers, such as harsh braking, to avoid collisions with other road users;
- (d) ISA, which will prevent bus speeding incidents and therefore reduce the impact of slips, trips and falls caused by harsh acceleration, braking or other manoeuvres at higher speed;
- (e) Direct and Indirect Vision requirements to improve bus drivers' awareness of surrounding to help them anticipate other road users' movements;
- (f) collision avoidance technology, which help to reinforce good driving behaviours, such as anticipating the conditions ahead and allowing sufficient space to brake smoothly; and
- (g) VRU alerting systems which alert the bus driver to the presence of vulnerable road users which may help reduce sudden braking events.

9.4 Additional work has commenced on further improvements that may prevent slips, trips and falls. For example, the provision of CCTV images to drivers has been identified as a possible safety intervention that could reduce the incidence of passengers injured through a number of specific scenarios, including falls on the

stairs and middle door entrapments. This project will investigate the advantages and disadvantages of different bus driver CCTV Human Machine Interface (HMI) parameters relating to the provision of images to the driver and the recommendation of evidence-based requirements.

Bus Safety Programme Strategy

- 9.5 An independent programme assurance group has recommended that an overarching strategy for achieving Bus Vision Zero is established. TfL has committed to producing a strategy document that will set out the approach to achieving Vision Zero for buses, the alignment with Vision Zero as a whole and the role played by the specific projects in TfL's investment programme. This will be completed in summer 2022.

10 Summary

- 10.1 TfL is committed to continual improvement of the safety of London's buses and bus network, and the health and wellbeing of bus drivers. There is clear evidence that our overarching Bus Safety Programme has improved safety whilst there is more that is being and can be done.
- 10.2 However, TfL's funding uncertainties have already impacted upon our ability to deliver some key existing projects and to commit to new projects that require funding beyond March 2022. The impact of two years of slowed development and research (due initially to coronavirus pandemic and now TfL's funding uncertainty) is that it is increasingly likely that TfL may be unable to achieve its Vision Zero targets for the bus network in the current timeframes set.

List of appendices to this report:

None

List of Background Papers:

Measuring and Improving Employee Health: Safety, Sustainability and Human Resources (SSHR) Panel, 14 September 2021

Bus Safety Programme and Driver Health and Well Being: SSHR Panel, 10 February 2021

Bus Safety Programme: SSHR Panel, 12 February 2020, 4 September 2019, 27 September 2018 and 23 January 2017

Bus Safety Programme: former Safety, Accessibility and Sustainability Panel, 30 June 2016 and 10 March 2016

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