

Mr Anthony Pepi  
Productivity and Safety Team  
National Transport Commission  
Level 3, 600 Bourke Street,  
Melbourne, Vic 3000

13th February, 2020

Dear Mr Pepi

**RE: Innovative Vehicles**

Thank you for the opportunity to make a submission on the issues related to the operation and regulation of innovative vehicles and motorised mobility devices in the Australian road related environment.

Bicycle NSW has been the peak bicycle advocacy group now in NSW for over forty two years, and has over 30 affiliated local Bicycle User Groups. We welcome to opportunity to contribute to making local roads safer for the people of NSW, and to supporting measures that will enable more people to cycle safely.

The regulation of innovative vehicles has a significant impact on people riding bikes as these vehicles share roads, bike paths, shared paths and footpaths with people who ride bicycles. In spite of current regulation prohibiting the use of innovative vehicles, electric scooters, Segway's, electric skateboards and mono-wheels are being used throughout NSW.

Share bike schemes and share e-bike schemes in Sydney and Newcastle have demonstrated the desire for last-mile mobility solutions, and the preparedness of people to use them. However in most areas of the state people need to provide their own devices to meet their transport needs.

Solving the 'last mile' helps more people access public transport networks, work, education or services without adding to parking pressures and road congestion. NSW has also seen the largest growth in bike-based food delivery services and the commercial applications of innovative vehicles must also be considered as part of this review.

**1. What characteristics need to be considered when defining what an innovative vehicle is?**

The characteristics that must be considered are the:

- dimensions, weight, speed, height, length, 'clearance' distance for obstacles or potholes
- maneuverability, traction, stopping distance, turning circle, cornering ability, breaking system
- user attachment or restraint systems,
- ability to be detected visually during the day and at night, and audibly at any time
- ability to be distinguished from other vehicles,
- capacity of the vehicle to track user journeys or behaviour, and the legal and privacy implications of sharing this information, and
- user constraints imposed by vehicle design – for example to use a traditional e-scooter or e-skateboard the user must be able to stand and balance, whereas an e-scooter with a seat is accessible to someone with a lower limb injury or disability.

## 2. What differences between motorised wheelchairs and mobility scooters need to be recognised by this project?

- Wheelchair innovation has seen motorised<sup>i</sup> and non-motorised<sup>ii</sup> wheelchairs developed with sit-to-stand capability, and the ability to climb stairs.<sup>iii</sup> We see people use roadways and bike paths when footpaths or curb ramps are not provided, removed by construction or are unsafe for heavier or wider devices to use.
- In our advocacy we often see infrastructure designers implement temporary measures during construction, or final projects, that fail to provide for safe, inclusive use by people who depend on current mobility assistance technology. This disabling practice needs to stop.

Any regulation should set standards that enable road managers and those developing innovative mobility solutions to increase transport accessibility. This needs to include novel vehicles or wheelchair attachments that enable the chair to be used as an e-chair or vehicle.

## 3. What uses of innovative vehicles need to be considered as part of this investigation?

Any consideration of 'innovative vehicles' must also take account of:

- **Passenger transport-** tandem bikes, bike-mounted child carriers, bike trailers for passengers and trishaws are all likely to evolve as people seek solutions to the problem of transport. Forbidding innovation in this space or the carriage of a passengers excludes people needing to transport small children, frail elders or people with disabilities. It also disproportionately disadvantages women, who are more likely to have to 'trip-chain', dropping off children or dependents as part of their commuting journeys<sup>iv</sup>.
- **Animal transport-** 40% of Australian households own a dog and a further 20% own other pets,<sup>v</sup> but most public transport, taxis and car sharing services prohibit access by some or all pets. We are also aware of pet owners being booked by police for attempting to transport an animal using a bicycle. Pet ownership is commonly given as the reason people need to own a car. Innovative vehicle solutions may help more people meet their transport needs and responsibility to their pets, without needing to own a car.
- **Innovative vehicles in the workplace** - The rapid uptake of food delivery by bicycle and e-bike in NSW has shown there is an urgent need to consider innovative vehicle use for the movement of goods and as part of service delivery. Food delivery by bike helps de-congest cities and can reduce carbon pollution, congestion and parking pressures.

However e-bikes zooming up footpaths highlights the lack of safe infrastructure, and rates of rider injury<sup>vi</sup> and fatalities have become disturbing. The business models of the food delivery companies places undue pressure on riders to speed, compromise safety and to use over-powered or modified e-bikes that are unsafe and non-compliant with current laws. We need infrastructure and regulation that promotes bicycle and innovative vehicle use to deliver goods and services in ways that are safe for riders and the community.

The UK has trialled drone delivery of defibrillators to homes<sup>vii</sup> to beat the traffic in emergencies, and amazon is already using parcel delivery robots overseas.<sup>viii</sup> Australia needs to properly

examine the benefits and potential consequences of these technologies, and to regulate and enforce accordingly to maximise the benefits and minimise injuries and fatalities.

- **Private transport of goods** – innovative vehicles may be used to transport goods whether the operator travels with the goods or not. We need to establish how trailers, innovative devices or other fittings may be used to enable people to transport work, sports, school equipment or other goods, and how this may impact other road users. We also need standards and tests for how loads impact vehicle performance.

At the International Cycling Safety Conference in Brisbane in November 2019 we heard from Prof. Arend Schwab of Delft University of Technology, Netherlands about the 2018 Stint (a device like a Segway-powered wagon) accident in the Netherlands where 4 children were killed and the driver and another child seriously injured when the Stint did not brake properly and went through a rail crossing and was hit by a train. This example demonstrated the need to test innovative vehicle safety performance under load, to ensure that new technology is safe enough to use in the road related environment.

- **Inclusive technology** – Australia needs more inclusive transport options that enable people with low or no vision and those unable to hold a licence to use individual transport. Innovative vehicles could become part of a transport solution enabling more people to get where they need to go. We need regulation that ensures vehicle operating systems keep all road users safe, especially people riding bikes and walking, when the innovative vehicle is being controlled by a computer, remote operator or other operating system.

#### **4. What key factors need to be considered when determining safe rules of operation (including speed) for innovative vehicles on roads and road-related areas?**

Critical considerations include:

- Which sort of vehicles should be allowed on, and excluded from, footpaths
- Road types where innovative vehicles are allowed
- The failure to provide safe, separated networks of cycleways in most parts of Australia that could be used by innovative mobility vehicles
- Regulations related to the hours of operation or conditions related to night time operation
- Operator education and/ or competency requirements
- The wearing of personal protective equipment or fitment of user restraints such as seatbelts

#### **5. What are the practical and measurable outcomes required from a nationally consistent policy and regulatory framework for innovative vehicles?**

We advise the recording of crash statistics that are distinct from bicycles but which encompass similar crash feature recording. If technology allows it would be ideal to collect user behavior (at the level of trips only not individual users) information such as distances travelled, journeys replaced (by foot, car, bike, public transport) and journeys enabled. This is unlikely to be possible with private devices, but commercial shared schemes provide an opportunity to understand travel behavior, desired journeys, injury blackspots and travel heat-maps.

### 6. What evidence-based distinctions between acceptable and unacceptable levels of risk associated with the use of innovative vehicles could be considered to inform the way innovative vehicles are regulated?

Evaluating risk to the person travelling via an innovative vehicle could be approached by using comparative risk evaluations and micromorts – a unit of risk defined as a one-in-a-million chance of death.<sup>ix</sup>

In order to increase the person’s death risk by one micromort, you would need to travel the following distances:

Motorbike	9.7 km
Bicycle	16 km
Walking	27km
Car	370 km
Jet	1600 km
Train	9656 km

However these figures reflect the risk posed by accidents and they fail to take into account that in most cases the cause of fatality is being hit by a motor vehicle. Whilst the relative risk of travelling by car is low, the more of these vehicles that operate on road related areas, and the faster they go, the greater the risk to people walking and riding bikes.

We know that the current level of risk of injury and death posed by riding a bicycle is intolerable for most people in NSW. 70% of people, when surveyed,<sup>x</sup> are too concerned about safety to ride their bike. NSW has Australia’s lowest weekly participation rates according to the 2019 Cycling Participation Survey,<sup>xi</sup> but cyclist injury rates appear to be on an overall upwards trend according to Transport for NSW data.



As the Sydney Morning Herald pointed out over 1100 cyclists were injured just in Sydney in 2018, 80% more than in 2005.<sup>xii</sup>

According to the Australian Automobile Association's Benchmarking report there were 1,222 road deaths in the year ending June 2018, and 1,100 were due to how drivers were driving.<sup>xiii</sup>

Innovative mobility devices offer an opportunity to reduce the number of motor vehicle journeys and de-risk the overall transport system. However most individuals are unprepared to tolerate the level of risk involved in bicycle travel in the current system, and certainly would not tolerate this level of risk exposure for children or elderly relatives.

We recommend reducing risk levels to become closer to that of walking. However we acknowledge that there is little that people walking, riding bicycles or using innovative devices can do to change the behaviour of motor vehicle operators, who pose the greatest risk to human life and health in the road related environment.

### Further considerations

Bicycle NSW is concerned that the questions posed neglect three fundamental issues.

#### There's nowhere safe to ride

The crucial issue is that NSW has historically underspent on safe separated infrastructure that could be used by bike riders and innovative mobility devices, and that eliminates the main hazard posed to people by motor vehicles. The state boasts over 1,000km of motorway and an annual transport budget of over \$10 billion, but less than 1% is spent on bike infrastructure and the state has only 15km of separated cycleway, 60km of bike path, 3,821km of shared path.



<https://bicyclensw.org.au/lagging-behind-the-pack-correction/>

It is impossible for most people in NSW to complete their journeys on safe separated infrastructure free of motor vehicle traffic. This undermines the goal of the NSW Government's Future Transport 2056 plan to increase the rates of active transport use for journeys of under 10km.<sup>xiv</sup>

Other states are doing a far better job of infrastructure provision, and everywhere except NSW and Victoria allows people of all ages to ride bikes on the footpath. The introduction of innovative mobility devices will be easier in states with better cycling infrastructure. However if there is a large speed, size, weight or performance differential between these new devices and bicycles, this could pose a hazard to people using them, or to bicycle riders, or both.

It is critical to recognise that infrastructure built for bicycles and pedestrians may not be suitable for innovative mobility devices. The smaller wheels of e-scooters are more likely to get stuck in drainage grilles and are more affected by rough surfaces and potholes than bicycle wheels. Damaged road

surfaces, slippery road plates and markings cause bicycles to crash, and can affect e-scooters even more.

A presentation at the International Cycling Safety Conference in Brisbane discussed a study of small-wheeled transportation hazards, signal design and roadway design and the development of a design handbook for city engineers.<sup>xv</sup> Bicycle NSW recommends using lessons learned overseas to develop design advice for Australian road designers and regulation.

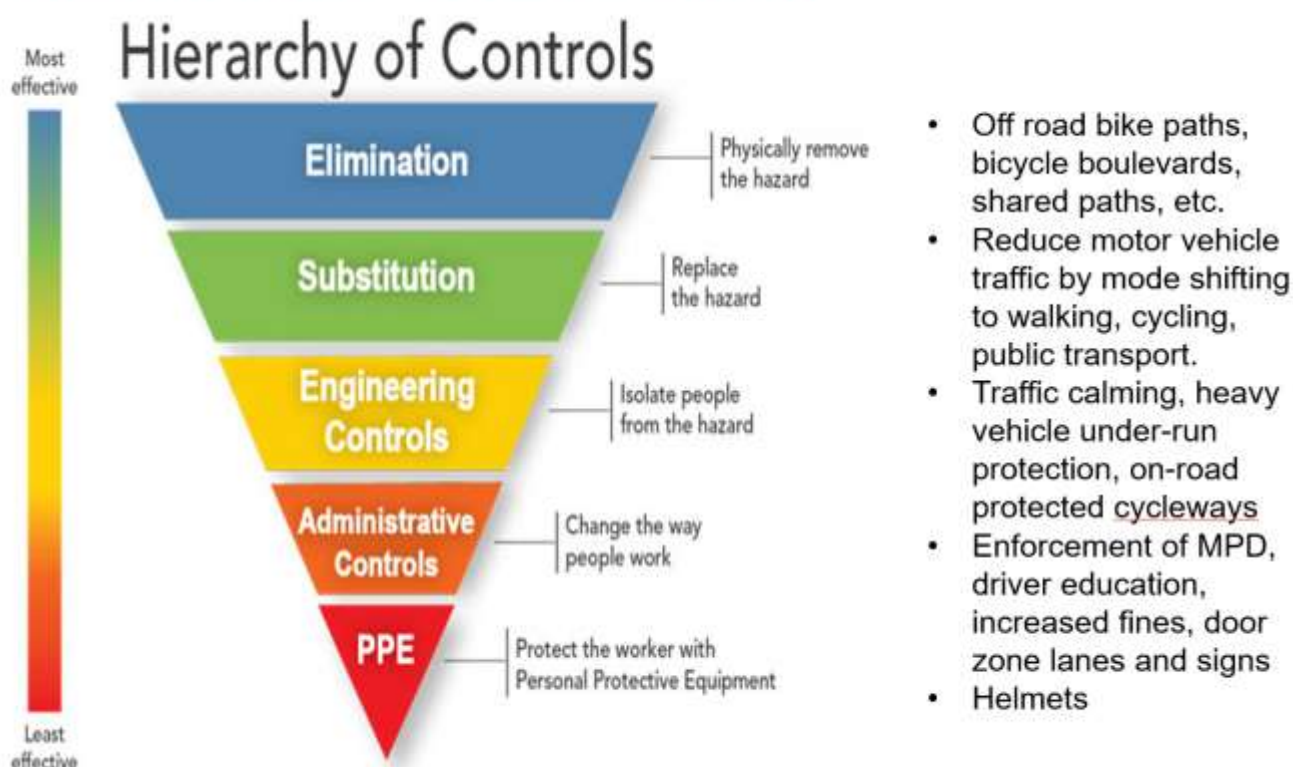
### The risk management focus is in the wrong place

Bicycle NSW has amended the Hierarchy of Controls for Risk Management<sup>xvi</sup> to focus on hazard reduction for bike riders.

Currently NSW Transport road safety education over-emphasizes helmets and bells in road safety education related to bike riding. These devices are of limited help when a rider is hit by a motor vehicle, and 12 of the 14 rider fatalities last year involved riders who were wearing a helmet.

The critical risk to people riding bikes, walking and using innovative mobility devices comes from people operating motor vehicles. Currently NSW Transport focuses expenditure and infrastructure provision on moving motor vehicles faster, and safety campaigns on having vulnerable road users stay out of the way or don relatively ineffective personal protective equipment.

## The Hierarchy of Controls for Bike Riding



Innovative vehicles could offer a substitution for some of the hazardous journeys by motor vehicles, but it isn't possible to de-risk active transport or achieve Towards Zero goals until the infrastructure, education and enforcement focuses on reducing the hazards posed to people by motor vehicles.

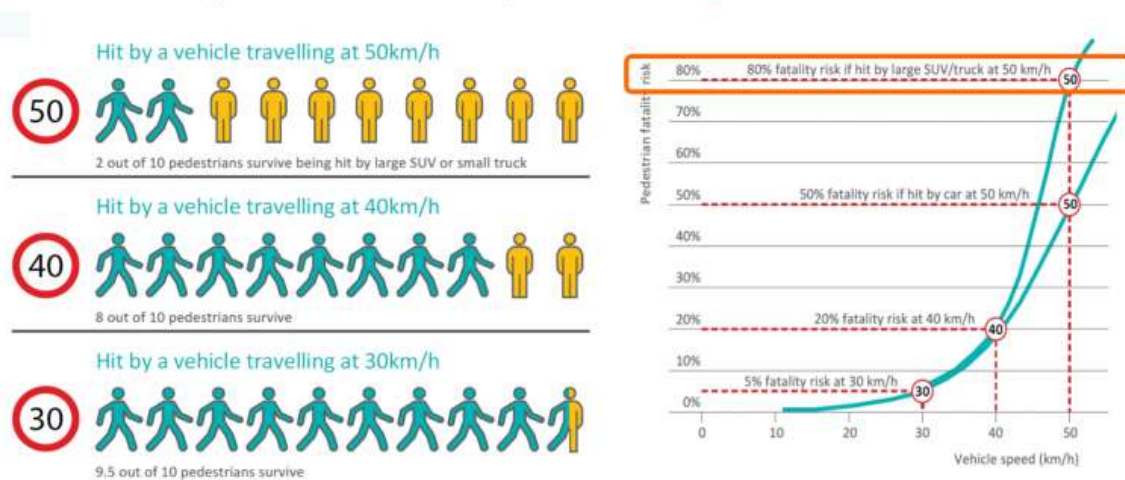
Bicycle NSW recommends the development of safe, separated networks of cycleways, speed reduction and traffic calming measures on local roads, mandatory blind spot detectors and side under-run protection for all heavy vehicles, better driver education and mandatory road rule education and testing

as part of license renewal and better enforcement of the road rules that protect people such as minimum passing distances, speed limits, stopping at crossings and safe speeds around schools and other areas popular with vulnerable road users.

These measures will make bike riding, walking and using innovative mobility vehicles safer.

The current focus on moving motor vehicles faster is costing lives. We recommend a focus on the safe movement of people, and that state governments, councils and police be measured, recognised and incentivised on safe movement measures.

### Slower vehicle speeds lead to increased pedestrian safety



Above: Only 20% of pedestrians survive being hit by a large SUV or small truck at 50km/h; 50% survive being hit by a car at 50km/h; 80% survive at 40km/h; and 95% survive a collision at 30km/h. Source: Austroads 2012, On Road Cycling on Higher Speed Roads, and Kroyer (2015), IATSS Research. Passenger cars make up 58% of motor vehicles registered in Waverley LGA, while SUVs + trucks make up 32%.

Bicycle NSW would like to see driver education and enforcement emphasise safe behaviour. We'd also like to see sharing of best practice, and national awards recognising the best performers.

### Enforcement focus

Across Australia the enforcement of road rules is failing pedestrians and bike riders and it will fail users of innovative mobility devices if it does not change focus.

Minimum passing distance legislation exists in every state except Victoria and in almost every case where a motor vehicle seriously injures or kills a person riding a bike, the driver passed too close to the rider. However our members report difficulties getting police to take reports or act on close passes, even in the case of repeat offenders or crash black-spots.

ACT Police will be enforcing safe passing using undercover police on bicycles,<sup>xvii</sup> and Australians need better enforcement of road rules that keep people safe. Waiting to fine or charge someone after a collision doesn't change behavior before vulnerable road users get hurt. Focusing enforcement on making people safer could include getting motor vehicles to stop consistently at pedestrian crossings, maintain safe speeds on local roads, around schools, and to pass people riding bikes or innovative mobility devices safely.

These are the kinds of changes that could help prepare Australian road related environments for future innovation and achieve the vision of zero road fatalities.

Yours faithfully,

Bastien Wallace BA LLB  
General Manager - Public Affairs  
Bicycle NSW

- 
- <sup>i</sup>Independent Living Centres Australia, IDC Medical Lifestand Stand Up Wheelchair, 2011 [Online 11/2/2020] [https://ilcaustralia.org.au/products/15011?search\\_tree=473](https://ilcaustralia.org.au/products/15011?search_tree=473)
- <sup>ii</sup>Rinchen Norbu Wangchuck, Why IIT-Madras's Affordable 'Standing Wheelchair, Can Be a Lifechanger for India's Diff-Abled, 2019 [Online 11/2/2020] <https://www.thebetterindia.com/202456/iit-innovation-madras-standing-wheelchair-invention-phoenix-india/>
- <sup>iii</sup>Rich Haridy, Stylish stair-climbing wheelchair merges the Segway with a tank, 2017, New Atlas [Online 11/2/2020] <https://newatlas.com/scewo-stair-climbing-wheelchair/48653/>
- <sup>iv</sup>Nicole Badstuber, Mind the Gender gap: the hidden data gap in transport, 2019, The Mandarin, [Online 12/2/2020] <https://www.themandarin.com.au/108874-mind-the-gender-gap-the-hidden-data-gap-in-transport/>  
Women do 75% of the world's unpaid care work which affects their travel needs
- <sup>v</sup>RSPCA, How many pets are there in Australia? [Online 12/2/2020] <https://kb.rspca.org.au/knowledge-base/how-many-pets-are-there-in-australia/>
- <sup>vi</sup>Naaman Zhou, Accidents, stress and Uncertainty: food delivery riders lift lid on work conditions, 2018, The Guardian [Online 12/2/2020] <https://www.theguardian.com/business/2018/may/01/accidents-stress-and-uncertainty-food-delivery-riders-lift-lid-on-work-conditions>
- <sup>vii</sup>BBC, [Online 12/2/2020] <https://www.bbc.com/news/av/technology-40360164/the-defibrillator-drone-that-can-beat-ambulance-times>
- <sup>viii</sup>Greg Nichols, Amazon delivery robots are officially on the streets of California, ZDNet [Online 12/2/2020] <https://www.zdnet.com/article/amazon-delivery-robots-are-officially-on-the-streets-of-california/>
- <sup>ix</sup> Fry AM<sup>1</sup>, Harrison A<sup>2</sup>, Daigneault M<sup>2</sup>, Micromorts--what is the risk?, PUBMED, 2016 Feb;54(2):230-1. doi: 10.1016/j.bjoms.2015.11.023. Epub 2015 Dec 30
- <sup>x</sup>Sydney's Cycling Future: Cycling for everyday transport, (2013), NSW Government, [Online 28/1/2020] <https://bit.ly/3albJj>
- <sup>xi</sup>Austroroads, Australian Cycling Participation 2019: Results of the 2019 National Cycling Participation Survey, [Online 28/1/2020] <https://bit.ly/2U08x9S>
- <sup>xii</sup>Nigel Gladstone, Cyclist injuries reach record high as families fight for bike paths, (2019) Sydney Morning Herald, 11/10/2019 [Online 28/1/2020] <https://bit.ly/2U8lvRE>
- <sup>xiii</sup>Australian Automobile Association, Benchmarking the performance of the national road safety strategy, June 2018 [Online 12/2/2020] [https://www.aaa.asn.au/wp-content/uploads/2018/08/AAA-Benchmarking-Report\\_Q2-2018.pdf](https://www.aaa.asn.au/wp-content/uploads/2018/08/AAA-Benchmarking-Report_Q2-2018.pdf)
- <sup>xiv</sup>Future Transport 2056, NSW Government, [Online 28/1/2020] <https://future.transport.nsw.gov.au/>
- <sup>xxv</sup>Y. Wen, N. Shah, C.R. Cherry, Infrastructure Challenges for designing Roads for small Wheel Transportation such as Electric Scooters: A Complete Streets Perspective, *University of Tennessee, Knoxville, USA*, [ywen4@vols.utk.edu](mailto:ywen4@vols.utk.edu), [nshah12@vols.utk.edu](mailto:nshah12@vols.utk.edu), [cherry@utk.edu](mailto:cherry@utk.edu)



---

<sup>xvi</sup>Kevin Druley, The Hierarchy of Controls: Strategy for safety singles out hazards before work starts (2018), Safety and Health, The National Safety Council, [Online 28/1/2020] <https://bit.ly/2U1B5jm>

<sup>xvii</sup> Bicycle NSW, 2019, [Online 13/2/2020] <https://bicyclensw.org.au/holding-out-for-a-hero/>