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Dr Allison Stewart
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Dear Dr Stewart

AUTOMATED AND ZERO EMISSION VEHICLE INFRASTRUCTURE ADVICE

The City of Melbourne welcomes the opportunity to respond to the *Evidence Base report* (the report) published by Infrastructure Victoria (IV) in August 2018. Please note that this feedback is provided on behalf of the management of the City of Melbourne and does not represent the views of the Council.

The City of Melbourne would welcome the opportunity to further discuss any aspect of this submission with IV.

Thank you for the opportunity to provide this feedback.

Yours sincerely



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Submission to Infrastructure Victoria

Automated and zero emission vehicle infrastructure advice – Evidence Base report August 2018

Introduction

We support the notion that the future of new technologies in the transport sphere is highly uncertain. We agree that IV's final advice to the Victorian Government should exercise restraint and caution. Due to the degree of uncertainty, it is critical that the advice be guided by and aligned with existing policy. Of particular relevance is the Transport Integration Act (TIA) 2010 which provides well supported principles and objectives to guide transport-related decisions into the future. Equally, the advice should emphasise the need for the Victorian Government to demonstrate leadership and provide clear directions to industry as to how new technologies should be accommodated in our city. The advice needs to indicate if and how new technologies can deliver benefits to the community and what the barriers are to achieving these benefits. Importantly, it should also emphasise the risks of new technology to the city and its people.

In principle, new technologies need to provide solutions to existing problems facing the city. Technology needs to be user centred in design to meet the needs of the community. It is uncertain whether AVs and ZEVs are the most suitable or effective response to the current challenges facing the city.

Recent experience provides insight into the economic and environmental risk of disruptive transport technologies. In June 2017, dockless share bikes were distributed across the city with limited management, maintenance or strategy behind their deployment. Despite the company's claim that bikes could be of benefit to the city, the clean-up cost and environmental harm was significant. Government needs to better understand the challenges and risks of future technologies to be more responsive in the future.


The City of Melbourne strongly recommends that the TIA objectives be used to frame the advice provided to the Special Minister for State. The current report does not place the seven scenarios into a strategic context. For example, cheaper mobility through electrification is presented as inherently positive. Making it easier for people to drive is not an objective of *Plan Melbourne* or any other strategic planning document in Victoria. IV's advice should be based on the evidence and framed as the best course to achieve existing planning goals. The current advice would be improved by including a cohesive narrative on what outcomes are desired by the community for the future.

While modelling is a powerful tool to understand possible scenarios and trends, it has limitations and it is important that the advice anticipates unforeseen implications and possible risks of new technologies. The City of Melbourne cautions against an attempt to be overly specific in the recommendations.

City of Melbourne transport

Melbourne's central city is a very different place to the rest of Victoria. It is the hub of the State's radial public transport system, has a high population density and is the economic engine of Victoria. The street network of the central city is highly walkable and enables frequent social interaction and the sharing of ideas. While IV's advice should consider all of Victoria we request that the unique qualities of the central city and the importance of a people friendly city be specifically recognised. Motor vehicles (including AVs and ZEVs) will likely play an





important role in the future but Melbourne's success as a global city depends upon safe and vibrant people-friendly streets.

IV's advice should apply a holistic understanding of transport accessibility, not solely private vehicle accessibility in the policy context of Victoria. All transport modes need to be considered as an integrated system throughout the analysis. For example, *Private drive* was recognised to have the highest level of 'access to services with the continuation of private ownership of vehicles leading to a low marginal cost of travel ([Deloitte socio-economic impact analysis](#)). However, this fails to effectively consider mode shift. Increasing awareness of the real cost of travel will support City of Melbourne goals and encourage mode shift toward more sustainable and space efficient transport.

IV's advice to government needs to enable the public to better understand the real cost of travel and make more sustainable choices. The choices must be guided by Victorian policy including Plan Melbourne and the TIA. The transport system is multimodal and AVs (like private vehicles today) will be just one option in our future transport mix.

City of Melbourne research

The City of Melbourne has undertaken research to explore future scenarios and plan for our future transport system. This work has been guided by Council Goals and is to inform the current Transport Strategy Refresh.

Research includes:

- [Impacts of emerging transport technology](#) – Transport Strategy Refresh background paper
- [Transport, Greenhouse Gas Emissions and Air Quality](#) - Transport Strategy Refresh background paper
- [Transport Pricing](#) - Transport Strategy Refresh background paper
- [Emerging transport technologies](#): Assessing the impact and implications for the City of Melbourne

Other relevant submissions include:

- [Submission to Infrastructure Victoria](#) – Automated and zero emission vehicle infrastructure advice February/March 2018 Submission
- [Submission to the National Transport Commission](#) - Changing driving laws to support automated vehicles November 2017


Key findings and recommendations for consideration by IV in its advice:

1. Safe streets and a city for people

Lower speeds will remain the primary safety objective for walkable streets. Technology advancements and innovation are important and will be supported and enabled by the City of Melbourne. However, our priority must be a city for people. Pedestrian safety and priority will remain critical in our people focused city which must look, feel and be safe.

2. Cost implications of driverless cars

Without transport pricing reform, the arrival of driverless cars could have serious financial and congestion effects. Empty cars could congest streets, won't need to park in paid bays and be programmed not to incur traffic fines. This could eliminate \$87 million in City of Melbourne parking revenue and \$323 million in Victorian Government traffic fines. IV's advice should respond to these potential changes to government revenue.



3. Emissions and air quality

Current transport emissions in the City of Melbourne exceed the levels required to meet Australia's obligations under the Paris Climate Agreement. Private cars account for around 52 per cent of land transport emissions in the municipality. Electric cars have the potential to reduce emissions if they are powered by renewable energy. Victoria's coal fired power means that the CO₂ emissions of today's electric cars are no cleaner than conventional cars. Recognising this, IV's advice should strongly support a shift towards renewable energy generation.

4. More efficient driving

There may be opportunities to make driving more efficient by providing incentives for vehicles with higher occupancy or supporting other ways of sharing vehicles such as car share and car pooling. Shared mobility businesses need to integrate and support public transport and not compete with it. This recommendation is relevant to IV's advice which should consider ways to increase the occupancy and sharing of vehicles. A key characteristic of central Melbourne is that it is space-constrained. Its success is dependent on face to face interactions among people for all the activities that occur in a busy city. It relies on space-efficient transport such as trains and trams to be successful. Motor vehicles are the least space efficient mode in Melbourne. This will not change if the vehicles are automated or electric. The large amount of space these vehicles need for moving and storage undermines the ability of people to interact and meet face to face. It is essential that IV's advice emphasise that motor vehicles are the least appropriate mode for the central city and that transport policy should continue to support public transport, walking and cycling as the modes to be prioritised for access to and movement within the central city.

5. City Freight and Delivery

Goods delivery to shops, cafes, restaurants, offices and homes is at the heart of how our city works. Efficient freight movement improves liveability, prosperity and sustainability. 'Last kilometre freight' should take priority over private vehicle traffic. As in Bourke Street Mall and Swanston Street, time-managed access for deliveries can work well in pedestrianised areas. The freight sector needs to be more efficient and innovative. With regard to the central city, IV's advice should include considerations of ways that AVs and ZEVs can improve last kilometre freight and reduce its impact on the city's transport system and public life.


6. Integrate driverless cars with public transport

To maintain a prosperous and liveable city into the future, clear regulatory signals are required now to ensure driverless cars support public transport rather than compete with it. New regulation needs to be consistent with the objectives of the Transport Integration Act 2010 to achieve socio-economic inclusion, economic prosperity, environmental sustainability, integration of transport and land use, efficiency and reliability, and enhance safety, health and wellbeing. It is clear that having more privately-owned cars in the city will not achieve these objectives. IV's advice should include recommendations with regard to the design and operation of high capacity transport interchanges. A reduced need for private vehicle storage and parking at train stations is a significant opportunity.

7. Support a shift towards Mobility as a Service

IV's advice should encourage partnerships between government and mobility providers to promote the consolidation and integration of services. Only through the integration of public transport, active transport and shared mobility options can the potential benefits of increased automation be captured.

8. Provide high quality alternatives to private vehicles



As established by the evidence base, Melbourne needs to significantly increase its transport capacity to serve a 65 per cent increase in the number of people in the city. The expansion needs to be based on space efficient modes better suited to city movement: public transport, cycling and walking. First steps include commencing detailed planning of Melbourne Metro 2, improving tram and bus performance and improving the network of high-quality separated bicycle lanes which will attract everyday riders. Given that AVs and ZEVs are poorly suited to dense inner urban areas (as private vehicles are today) IV's advice should support these actions as a priority. There are many aspects of AV and EV operation and planning which could work to improve the operation of public transport. For example, this could include reducing the congestive effects of motor vehicles on the on-road public transport system and the pedestrian network.

9. Investigate future data security risks

To prepare for new technology, new mechanisms for data protection are required. Robust and secure sensor network technologies need to protect the community against possible data/sensor tampering. Additionally, secure data practices must include users having full control of how their data is used. Research into this topic should specifically consider time and distance based road user pricing mechanisms.

Response to consultation questions

1. Are our key assumptions correct? If not, why?

IV assumption: The uptake of AV and EV is linear in each scenario, given the current low global penetration

IV assumption: AVs may make vehicle travel more attractive as researchers have estimated people could value time in an AV at between 34-70 per cent as much as time spent in a normal car.

CoM response: A future variation of the Marchetti constant should be carefully considered. This assumption would also result in a reduction in social interaction.

IV assumption: Fuel, battery and hydrogen efficiency and prices remain constant in real terms between now and 2046. This is not likely to be the case, but evidence to predict how prices may change is not available.

CoM response: Does this assumption preference established technology and fuels over emerging? Battery and/or hydrogen production costs are likely to decrease if they become common fuel sources.

IV assumption: Victoria will have net zero greenhouse and gas emissions in 2050 which is in line with the Victorian Government's target

CoM response: The advice should reinforce the importance of investment in renewable energy to meet the Victorian Government target for 2050. The City of Melbourne also holds ambitious targets for [emissions reductions](#). A new Climate Migration Strategy is currently being finalised.


IV assumption: fares for on-demand fleet vehicles will be 30% of current Uber fares, based on the assumption that due to the lower cost of battery EV and the removal of the driver, fares would be reduced by an equivalent amount in a competitive market.

CoM response: This is substantially lower than existing public transport fares so it is important that further work be undertaken to understand what kind of mode shift this would lead to.

IV assumption: The 'flow factor' for AV is 1.75 in that 1.75 AV can move through the same point on the road as 1 non-AV, and so are .75 per cent more efficient. IV has applied this assumption to all roads and intersections, as AVs are assumed to be more efficient due to connectedness from a standing start and while moving.

Research suggests AV flow factor is between 1.5 to 2.0

CoM response: This efficiency increase is much less applicable in the central city. Locations of high demand mean that space intensive private vehicles become less efficient. Research around the world has shown that only high capacity public transport, supported by cycling and walking, can support efficient movement in high



density inner urban locations. IV's advice needs to recognise this and advise on the best ways to ensure new technologies integrate and support efficient public transport and the people-focussed walking environment of the central city.

IV assumption: Driverless vehicles will eliminate all of the estimated 94 per cent of vehicle crashes for which human error is the main cause

CoM response: *Is this assumption only for interactions between AVs? What about the scenarios where there is a mixed fleet? This assumption may be considered overly optimistic and caution should be exercised throughout the advice and analysis.*

2. Is our analysis of the findings correct? If not, why?

Multimodal accessibility

'Accessibility' as outlined in the report takes a narrow view. Private vehicle accessibility is only part of the accessibility picture. Changes in private vehicle accessibility will influence other modes, both in terms of their attractiveness and their infrastructure. For example, reducing the per-km cost of driving may encourage people to take trips they otherwise would have biked or walked. By suppressing the demand for other modes a feedback loop could be created where investment and maintenance dries up, resulting in decreased accessibility for people who use alternative modes. The accessibility of the transport system as a whole must be considered, as the advice must recognise all transport users. Everyone uses multiple modes on a regular basis and is therefore affected by changes to multiple modes.

Bicycle infrastructure

There appears to be an assumption that in *Fleet Street*, bicycles will be safe from vehicles and protected separated bike infrastructure will not be required. This is unlikely to eventuate because even with fully automated technology, the rider's perception of safety will become a greater influence on mode choice than actual risk. A large fast moving metal box will remain a perceived threat to vulnerable road users. By the time AVs arrive, we expect to have achieved higher mode share through improved bike infrastructure – separated bike lanes are likely to exist and be required in all scenarios. Equally, we cannot separate modes in all locations so lower speeds in quiet residential areas will support active transport modes.


Extensive testing and trailing will be required to understand vulnerable road user responses to AVs. Separated bike lanes are likely to be needed in more locations in order for AVs to operate at speeds competitive with private vehicles today. While the City of Melbourne supports separated bike infrastructure, any recommendation to reduce the permeability of the public realm would not be supported.

3. What further research into automated and/or zero emissions vehicles might be required beyond what we have already completed or identified?

Health implications

The considerations of health implications are very limited and only focus on road trauma and air quality. It is important to recognise that lower cost trips in driverless cars could incentivise a mode shift away from active travel. This would have substantial cost implications for Victoria's health system. If possible, this cost should be quantified. Active modes also enable social interaction and improve mental health. Statements such as 'electric cars are good for your health' are misleading as the analysis considers only the impact of reduced emissions at the tailpipe.

Speed restrictions



Slower speeds are of benefit in urban environments to improve health outcomes and economic performance of cities. It would be valuable to understand if with the assumed efficiency increase, AVs could operate at lower maximum speeds while maintaining comparable average speeds to today.

Intersection capacity

It would also be valuable for the City of Melbourne to understand how and where a reduced requirement for vehicle storage at intersections can provide opportunities to expand the public realm and provide wider footpaths and improved urban amenity.

4. What are the local or international trends government should be monitoring to help inform future decisions on automated and zero emissions vehicles?


On street charging infrastructure

Local government has not traditionally played a role facilitating or providing refuelling locations for vehicles, which up until now have required intermittent refuelling at designated facilities (service stations). However, the different refuelling requirements of private electric vehicles will place pressure on City of Melbourne-managed spaces to facilitate or provide charging infrastructure. A transition to electric cars could enable petrol station sites to be redeveloped for more productive public uses. This land use transition offers the potential to support council goals.

Many cities, particularly in Europe, provide or allow charging infrastructure on-street. European cities are generally centuries older than Melbourne and due to urban development before motor vehicles have substantially less space provided for private motor vehicle movement and storage. Limited underground or above-ground off-street parking in these cities limits the capacity to charge vehicles off-street, particularly in older residential areas.

The City of Melbourne views off-street charging as the preferred option in the municipality as it can allow more space on the street for people to enjoy. There are currently over 49,500 off-street residential parking spaces in the municipality, with approximately 13,000 of these unoccupied. By providing charging off-street, vital public land on-street can serve the broader community as public space, urban greening, trees, wider footpaths, public transport priority or bike lanes. Car parking on the street is an inefficient use of high-value and high-demand central city space. The City of Melbourne continues to remove on-street parking as streets are improved. Installing electric vehicle charging on street, where off street alternatives exist, would place further barriers to these street improvements. The use of advertising to subsidise the cost of on-street charging infrastructure would be of particular concern to the City of Melbourne.

There are some locations in the municipality where on-street charging may be required, particularly in older residential areas where limited off-street parking is available. The City of Melbourne may consider on-street charging in locations where there is no viable alternative and space allows. Residential parking permit areas are potential places where on-street charging might be required. On-street charging is not supported in the central city, where footpath clutter is already an issue, parking bays are being reduced and ample off-street parking is already publically accessible. The City of Melbourne could play a facilitation role in providing off-street charging, through its links with the community and role as a planning authority. Short-term on-street public charging on a cost-recovery or commercial basis could be provided in appropriate locations where parking bays are expected to be maintained for the foreseeable future. Providing charging facilities will not be allowed in locations where the infrastructure negatively impacts other uses of the street.



5. What key decisions need to be made about the infrastructure required for automated and zero emissions vehicles?

Road user pricing

IV's advice should include the requirement for the Victorian Government to implement a road user pricing scheme in order to effectively manage transport demand in the future. The need for this policy reform will be further reinforced with the arrival of AVs. Our research has indicated that the arrival of SAE level 4 and 5 AVs will represent the latest point in time at which a road user pricing scheme must be implemented.