**Written evidence submitted by the Institute of Highway Engineers (SDV0013)**

## SUMMARY

The Institute of Highway Engineers welcomes this TSC call for evidence, as there is much that needs to be considered about our road infrastructure and current practices before connected and autonomous vehicles can be widely used. Most of the initiatives needed for CAVs will also be immensely beneficial for human drivers too. Better road maintenance, improved layout and signing of road works and a reliable dashboard indication of restrictions, such as the current speed limit, all have enormous value that extends way beyond the CAV sector.

## WHO WE ARE

The **Institute of Highway Engineers** is a professional body, a member of the Engineering Council that supports and provides training and accreditation for highway engineers at all levels. It is particularly prominent in the field of road safety, traffic signing and traffic regulation through it publication, conferences and close liaison with the Department for Transport (DfT).

## RESPONSES TO THE ISSUES POSED

### Likely uses, including private cars, public transport and commercial vehicles

We have no comment to make on this topic.

### Progress of research and trials in the UK and abroad

We have no comment to make on this topic.

### Potential implications for infrastructure, both physical and digital

### Standards of road maintenance

Both fully autonomous vehicle, and driver aids such as lane guidance and speed limit identification, need a sufficient standard of maintenance of road markings and signs. Unfortunately, our members are aware that funding for this maintenance is often lacking, resulting in poorly maintained roads, markings that are barely visible (or totally worn away in some cases), and road signs that are damaged, out-of-date, no longer reflective at night, or hidden by vegetation.

A commitment to the safe working of CAVs implies a much greater level of expenditure than at present on the maintenance of both trunk and local roads.

**Standard of roadworks signing**

A further issue highlighted by our members is the ability of autonomous vehicles to cope with roadworks. These of course will be encountered on almost every journey of any length. It will be an essential function of any autonomous vehicle to cope with the multitude of different types of lane closure, contraflow, temporary speed limit, lack of road markings, temporary signals and diversion. The need to adopt a different course can be indicated by road markings, cones, roads studs, signs on roadworks vehicles, or by verge-mounted or overhead matrix signs. The task is not trivial even for roadworks correctly set out in accordance with Traffic Signs Manual Chapter 8, but frequently on local roads and occasionally on trunk roads, the standard of temporary traffic management is woeful. Layouts can be counter-intuitive, and it is common to see signs that give wrong information, are poorly sited, not visible at night or not compliant with regulations. The design, setting out and maintenance of temporary traffic management for roadworks requires a much greater degree of training and supervision than at present to achieve safe layouts for all types of vehicle.

**The regulatory framework, including legal status and approval and authorisation processes**

**The need for equity between different modes of driving**

There needs to be a level playing field between autonomous vehicles and ones under human control. We rightly have a series of strict requirements and penalties for human drivers in order to improve road safety by deterring or

preventing behaviours that cause danger. The public has a right to expect that those providing autonomous technology will be subject to a similar level of scrutiny and be subject to meaningful regulation to ensure public safety. Experience in other fields is that this cannot be taken for granted, with many safety critical matters (such as building regulations) subject only to very light scrutiny and enforcement.

As an example, a human driver caught exceeding the speed limit 4 times in a two-year period is disqualified from driving for at least 6 months. Will the technology responsible for a type of autonomous vehicle that has been observed speeding multiple times have its approval revoked until the fault is rectified? This would require affected vehicles to revert to an earlier version of the software or even to be driven manually.

**Contraventions under civil law**

Most consideration of traffic rules for autonomous vehicles has focussed on what is currently covered by criminal liability and dealt with in the magistrates' court and on liability for collisions. But there is a further area of civil law that needs to be addressed under this heading, namely the liability of vehicle keepers to local and national authorities under the Traffic Management Act (or decriminalised enforcement under the 1991 RTA in Scotland). There could be occasions where a vehicle keeper is penalised for actions that were the fault of the automated software (such as driving in a bus lane). This is complicated by the fact the human driver might have instructed the autonomous vehicle to do something normally prohibited (such as driving through a bus gate), because they thought they were covered by a valid exemption. It can thus be very difficult to decide who is to blame for an infringement: human or computer.

Under the recent extension of civil moving traffic enforcement to authorities outside London, there will be a large increase in notices issued for alleged infringement of these rules for box junctions, banned turns, etc. 'Free-flow' toll roads and bridges are another reason for the despatch of notices of alleged infringement affecting CAVs. Clean air zones will be less of a problem, as CAVs are likely to be electric or compliant with the emissions standards required in these areas.

Authorities sending out penalty notices for civil infringements (and police forces issuing NIPs for criminal matters) will presumably continue to send them to the registered keeper of the vehicle, but there will need to be a way for the keeper to offload responsibility in appropriate situations to the autonomous technology provider, and a way of verifying that they are correct to do so.

**A digital 'Highway Code'**

The rules of the road clearly need to be stored digitally for both autonomous vehicles and for driver assistance technology. They are not at present. Taking speed limits as an example, currently available technology with forward facing cameras or a sat-nav database is no more than 85% accurate in giving a correct in-vehicle indication of the current limit. The Welsh Government has recently found Ordnance Survey's speed limit dataset to be so inaccurate as to be unusable. We very much support initiatives in this direction that DfT is already making to develop standard data formats for communicating regulatory measures and to explore changing the law to require authorities to submit changes to traffic orders, leading to a nationally available dataset of traffic regulation.

**Consistency**

For digital 'rules of the road' to work seamlessly across the country, further initiatives are needed that go beyond current DfT proposals. There needs be (with exceptions for genuinely unique situations) uniformity in the types of traffic order authorities can issue, and for a common understanding of definitions and terms used within them. An example is given below relating to the current inconsistent use of the words "authorised vehicles", but there are many other cases, such as where a type of vehicle is defined differently in some authorities, or exemptions for blue badge holders are inconsistent, leaving people unclear as to what rules apply at an unfamiliar location.

**UK-wide initiatives**

A further observation is that rules and standards need to be at least UK-wide and preferably international. The current DfT initiatives relate only to England, and there is a danger that other countries of UK will be left behind or possibly adopt incompatible requirements and standards. Traffic law is already

diverging in the different countries of the UK, for example in Wales where autonomous vehicles will need to know that street lighting without other signing means there is a 20 mph speed limit.

## Safety and perceptions of safety, including the relationship with other road users such as pedestrians, cyclists and conventionally driven vehicles

### Demonstrating safety benefits

Promotors of autonomous vehicle have often claimed large road safety benefits for them, such as eliminating almost all road collisions. Legislation should hold providers of this technology to account on this, and require a typical reduction in road collisions (or road casualties) of say 75% compared with the equivalent journeys made under the control of a human driver.

Autonomous vehicles will need to co-exist for a long time with human-driven motor vehicles and for ever with pedestrians, cyclists, motorcyclists, and other 'micro-mobility' vehicles, unless these modes can be totally segregated. The proof of any autonomous technology will therefore lie in how well it can cope with these sometimes-unpredictable other road users, particularly in urban situations.

## The role of Government and other responsible bodies, such as National Highways and local authorities; and potential effects on patterns of car ownership, vehicle taxation and decarbonisation in the car market.

### Promoting UK-wide standards and consistency

The role of the government has already been alluded to above to facilitate a digital set of 'rules of the road' and to promote some standardisations and uniformity in those rules, regardless of which traffic authority has made them.

An example of where this standardisation is currently lacking is the use of the words "authorised vehicles" on a traffic sign. These words are currently used inconsistently by different authorities on bus lane and bus gate signs, causing confusion and enforcement difficulties.

A joint body may be needed representing all the devolved nations to provide the authority for necessary initiatives for the whole UK. At present, the very welcome DfT proposals are addressed only to English authorities, as that is the limit of their remit.

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