



Washington State  
Transportation Commission

December 2023

# Roadmap to the Future

AUTONOMOUS VEHICLE WORK GROUP





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# OVERVIEW



Based on the information and insights that have been gathered throughout the five-year course of the Autonomous Vehicle (AV) Work Group, this report serves as the Roadmap to Washington's mobility future, proving a foundational resource for lawmakers to consider and refer to as deliberations occur around the advancement and regulation of autonomous vehicles (AVs) in Washington State. It also provides guidance for public agencies, as well as private and community partners, on what to focus on and develop as the state prepares for automated vehicle technologies to safely test and deploy on Washington public roadways.

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Six key components serve as the building blocks for this Roadmap, focusing on the key areas necessary to research, understand, develop, and refine during ongoing preparations to safely accommodate AV operations on Washington's public roadways:

- ▶ **Agency Readiness:** Build state agencies' AV knowledge base, structure organizationally to enable innovation and adaptability as AV technologies mature and are more prevalent in the state, and establish and maintain strategic partnerships with public, private, and non-profit entities to strengthen the state's readiness for AV operations.
- ▶ **Public Outreach:** Increase AV awareness among public and interested parties, understand varying needs from different perspectives, and communicate about AVs in a comprehensive, transparent, and equitable way.
- ▶ **Equity:** Engage with and understand various communities' access, mobility, and health needs to ensure they are addressed in AV policies implemented in the state.
- ▶ **Safety:** Identify potential safety implications of AV testing and deployments and establish mitigating policies and measures to ensure safety for all road users.
- ▶ **Testing & Pilots:** Evaluate AV testing and pilot opportunities to experience AVs in a real-world environment to better understand how AVs operate, the benefits they may bring, and the impacts and implications they may introduce.
- ▶ **Path to Deployment:** Provide clear expectations of regulatory agencies, supporting entities, and companies preparing to deploy AVs in Washington.

# SITUATION ASSESSMENT 2023

Many activities have been conducted in Washington State to date, to prepare for the testing and future deployment of AVs on its public roadways, including several recommendations by the AV Work Group during its purview and acted upon by decision makers through legislation or operational changes. These activities listed below demonstrate the initial steps taken in Washington for AV readiness and can continue to be built upon and expanded through future considerations discussed later in this report.

## AV READINESS ACTIVITIES COMPLETED TO DATE IN WASHINGTON STATE:

Established the Autonomous Vehicle Self-Certification Program

- ▶ The Program was established in 2018 via Executive Order 17-021, operated by the Washington State Department of Licensing (DOL), and requires companies testing autonomous vehicles on Washington roads to self-certify with the DOL.
- ▶ Companies seeking self-certification must meet requirements for operating with or without a human operator present.
- ▶ Companies must have an umbrella liability policy of not less than \$5 million per occurrence and must submit the Certificate of Insurance that shows they meet this rule (established via House Bill (HB) 26762).
- ▶ Self-certified companies must report collisions and moving violations annually to the DOL (HB 2676; implementation extended to 2022 via Substitute Senate Bill (SSB) 54603).
- ▶ Vehicles subject to the DOL AV Self-Certification Program operate at an SAE-defined automation level of Level 4 or Level 5 (established via SSB 5460).
- ▶ Legislative repeal of Revised Code of Washington (RCW) 46.37.480 (via HB 2676) that prohibited the use of television viewers or screens in a vehicle, potentially restricting some AV technologies. This RCW originally related to distracted driving and has been superseded by newer distracted driving RCWs used by law enforcement. Repeal of the RCW removed a potential barrier for AV use in the state.
- ▶ Connected and Automated Transportation (CAT) Policy Goals: The Work Group adopted eight CAT policy goals in 2019 to support a draft CAT Policy Framework to

1 Washington State Governor Executive Order 17-02: Autonomous Vehicle Testing & Technology In Washington State and Autonomous Vehicle Work Group: [https://governor.wa.gov/sites/default/files/exe\\_order/17-02AutonomouVehicles.pdf](https://governor.wa.gov/sites/default/files/exe_order/17-02AutonomouVehicles.pdf)

2 HB 2676, 66<sup>th</sup> Legislature. 2020 Regular Session. <https://lawfilesexternal.wa.gov/biennium/2019-20/Pdf/Bills/Session%20Laws/House/2676-SL.pdf?q=20231117081906>

3 SSB 5460, 67<sup>th</sup> Legislature. 2021 Regular Session. <https://lawfilesexternal.wa.gov/biennium/2021-22/Pdf/Bills/Session%20Laws/Senate/5460-SL.pdf?q=20231117082707>

support and guide AV Work Group strategy. The eight CAT policy goals adopted are: Organize for innovation, shared mobility, economic vitality and livability, infrastructure and context sensitive street design, land use, equity, safety, and environment. The Work Group then collaboratively developed strategies and illustrative actions to support each CAT policy goal, identifying tangible actions the Work Group, and Washington state agencies holistically, could take to further each goal.

- ▶ The AV Work Group’s Safety Subcommittee supported the Washington Traffic Safety Commission Advanced Driver Assistance System (ADAS) Survey<sup>4</sup> and related Education Plan.
- ▶ In 2021, the Transportation Commission recommended a state-sponsored pilot be conducted to further prepare the state for future AV operations. The Work Group explored and recommended on the pilot’s approach, use cases, goals and objectives, and administration and roles. The Work Group again recommended a state-sponsored pilot in 2023 for further legislative consideration.
- ▶ The AV Work Group conducted extensive best-practice reviews, hearing from several states on their AV-related laws, policies, regulations, and approaches to AV testing and deployments, including Utah, Michigan, Minnesota, California, and Arizona. The AV Work Group also engaged with the City of Seattle on its autonomous vehicle permitting program.
- ▶ The University of Washington Law School Technology & Public Policy Clinic conducted research on AV policies and approaches around the country over the course of the Work Group, providing research findings and recommendations for state AV policy to the Work Group.
- ▶ In 2019, the Washington State Department of Transportation (WSDOT) and the DOL held several discussions with self-certified AV companies about testing in Washington to better understand industry motivations for testing (or not testing) in Washington, what changes the state could explore to support safe testing in Washington, and what testing activities were currently occurring or being planned for in the state. As new companies self-certify with the DOL, these discussions continue.
- ▶ The Work Group’s Safety Subcommittee actively engaged with the Partners for Automated Vehicle Education (PAVE) Public Sector Advisory Council to identify learning opportunities, including webinars, educational presentations, and training resources for AV safety knowledge building across the country from a variety of public, private, and non-sector partners.
- ▶ The AV Work Group established the Washington Autonomous Vehicle Work Group Website which contains volumes of information gathered during the five years of the Work Group’s efforts.
- ▶ During its purview, the AV Work Group issued a quarterly newsletter, the “Washington Autonomous Vehicle Edition (“WAVE”)", providing the Work Group with updates on AV news around the country, as well as Work Group and legislative activity for AV preparedness.

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<sup>4</sup> Washington Traffic Safety Commission, 2021. *Advanced Driver Assistance System Survey*. [https://www.wtsea.com/uploads/2/6/5/7/26576289/wtsc-adas-survey\\_results\\_-\\_debbie\\_besser\\_-\\_doug\\_dahl.pdf](https://www.wtsea.com/uploads/2/6/5/7/26576289/wtsc-adas-survey_results_-_debbie_besser_-_doug_dahl.pdf)

# BUILDING BLOCKS FOR AN AUTONOMOUS VEHICLE FUTURE

Washington State's work is just beginning, and while much has been done to date, further regulatory and legal requirements will need to be established to fully address AV operations on public roads. The remainder of this report lays out the six building blocks, or areas of needed attention by policy makers and regulators as preparations continue. In assessing how to establish and implement the building blocks, decision makers will need to consider the following:

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- ▶ How will a particular action be established and implemented – is legislation required? Does a lead state agency need to be authorized? Do operational changes need to be made? etc.
  - ▶ How will a particular action be funded and resourced – state funding and authorization? Federal funding opportunities? Public private partnerships? etc.
  - ▶ What entities need to be involved in the development and implementation of a given action (public agencies (federal, state, and local), private sector companies and organizations, non-profit entities, community partners, advocacy groups, trade associations, the general public, etc.)?
  - ▶ What lessons can be learned from other jurisdictions to guide decision making (counties and cities within the state, other states who have taken action, and activity at the national and international level)?



# AV BUILDING BLOCK: AGENCY READINESS



# BUILDING BLOCK: AGENCY READINESS



As AV technology advances toward deployment, it will be important for agencies within Washington State to be resourced and ready to manage the many varied aspects of AV operations on public roadways, from safety to insurance to highway operations. Ensuring Agency Readiness will include:



- ▶ Ensuring the ability to adapt as transportation infrastructure becomes increasingly intertwined with new mobility services, digital communication, and AVs.
- ▶ Establishing and maintaining strategic partnerships with public, private, and non-profit entities.
- ▶ Being structured organizationally to enable innovation and operate in a nimble and pragmatic manner.

There are several public agencies in Washington State that will play a direct or supporting role when it comes to AV testing and deployment, including:

- ▶ Department of Transportation
- ▶ Department of Licensing
- ▶ State Patrol
- ▶ Traffic Safety Commission
- ▶ Department of Health
- ▶ Department of Labor & Industries
- ▶ State Insurance Commissioner

Public agencies, and the transportation workforce more broadly, have historically focused on constructing, operating, and maintaining physical infrastructure and legacy programs that support transportation services and mobility. However, government bodies and the transportation industry will need to adapt as transportation infrastructure becomes increasingly intertwined with technology, new mobility services, and digital communication. To adapt and prepare will require training existing staff, hiring new staff where needed, updating policies and procedures, and ensuring that any underlying systems are prepared to provide the necessary support. Private partnerships with industry may also need to be leveraged and expanded to help build expertise within the state.



## PERMITTING

Establishing permitting requirements addresses the level of engagement and oversight the State should have in regulating AV use on Washington's roadways.

Permitting can range from low (general guidelines for testing and deploying) to high (structured permit application and approval program). Permitting may include defining vehicle requirements, driver/operator requirements, minimum insurance and risk, engagement with law enforcement/first responders, or reporting expectations.

Permitting also includes defining what state agency(ies) is responsible for or may play a role in the permitting process (e.g., WA DOL currently operates the AV self-certification program).

### Existing AV Permitting Program in Washington

Current laws and regulations in Washington State explicitly allow AV testing, but do not explicitly allow operational AV deployments. The Washington State Department of Licensing's AV permitting program requires companies testing autonomous vehicles on Washington's public roads to self-certify with the Department via the online self-certification form.

Self-Certification requirements for AV testing with human operators present are as follows:

- ▶ Vehicles must be monitored.
- ▶ An operator must have the ability to direct the vehicle's movement if assistance is required.
- ▶ Anyone operating an autonomous vehicle needs a valid U.S. driver license.
- ▶ The operator must carry proof of valid insurance.

Self-Certification requirements for AV testing without human operators present are as follows:

- ▶ Proof of insurance, even when human operators are not present.
- ▶ Vehicles must be equipped with an automated driving system that performs all driving tasks on a part or full-time basis within their operational design limits.
- ▶ Vehicles must be able to make it to a safe condition in the event of a system failure.
- ▶ Vehicles must comply with Washington state motor vehicle laws relevant to the vehicle's operational design limits.

All AV companies seeking self-certification must have an umbrella liability insurance policy of not less than \$5 million per occurrence. Self-Certification companies must submit an autonomous vehicles collision report by February 1st every year, documenting collisions and moving violations for the prior year.

**Possible Actions:**

Refine the state's existing permitting program for AV use on public roadways.

- Determine what agencies play a role in the AV permitting process and provide dedicated staff and resources as needed to enable holistic management of an AV permitting program, from assessing on-road testing applications and operations, to compliance, to deployment. The AV permitting program should leverage existing permitting structures where applicable to reduce duplicative efforts.

**EXAMPLES:** California DMV has a robust permitting process for AV testing and deployment, with three levels: [Driver Required](#), [Driverless Testing](#)<sup>5</sup>, and [Deployment](#)<sup>6</sup> (with passengers). The process includes state approvals, permit fees, and continued change notification.

Arizona law allows AVs to operate on public roads without a driver after submitting<sup>7</sup> a set of written statements.

5 California Department of Motor Vehicles, 2023. *Autonomous Vehicle Testing*. <https://www.dmv.ca.gov/portal/dmv-virtual-office/autonomous-vehicle-testing>

6 California Department of Motor Vehicles, 2023. *Autonomous Vehicle Deployment Program*. <https://www.dmv.ca.gov/portal/vehicle-industry-services/autonomous-vehicles/autonomous-vehicle-deployment-program/>

7 Arizona Department of Transportation Motor Vehicle Division, 2023. *Autonomous Vehicles Testing and Operating in the State of Arizona*. <https://azdot.gov/mvd/services/professional-services/autonomous-vehicles-testing-and-operating-state-arizona>

## INFRASTRUCTURE

Infrastructure investments must be made to ensure the existing network can support and efficiently enable AVs operations.

Infrastructure improvements includes both physical changes, such as improving pavement markings and striping, as well as digital infrastructure, such as advancing the state's cloud network, data management capabilities, and roadside connectivity (e.g., broadband, 5G) in preparation to support various types of AV-related data directly from AVs and from partners (e.g., AV company testing information, city-level planning information, etc.).

### Possible Actions:

Identify and prioritize infrastructure investment needs to meet today's needs while considering tomorrow's technologies to support efficient and safe AV operation in the near- and long-term.

- Prepare an AV strategic plan which identifies long-term investment needs statewide, and organizational needs to implement desired outcomes. An AV strategic plan should address the level of need for physical and digital infrastructure investments, as well as funding approaches, resources, and partnerships needed to achieve the desired outcome.
- Evaluate and pursue funding opportunities, such as federal infrastructure improvement grant initiatives, to supplement state-level funding and resourcing of infrastructure investments.
- Appoint a State AV lead agency to lead the strategic planning effort, as well as coordinate activities across the various state and local agencies who play a role the testing and deployment of AVs.

**EXAMPLES:** Multiple states, including [Connecticut](#)<sup>8</sup>, [Florida](#)<sup>9</sup>, [Maryland](#)<sup>10</sup>, [Michigan](#)<sup>11</sup>, [Minnesota](#)<sup>12</sup>, and [Pennsylvania](#)<sup>13</sup> have completed AV strategic plans that outline and prioritize agency actions and infrastructure improvement opportunities to support safe AV testing and deployments.

8 Connecticut Department of Transportation (2021, March 29). *CTDOT Releases First-Ever Strategic Plan for Connected and Automated Vehicles*. <https://portal.ct.gov/DOI/CTDOT-Press-Releases/2021/CTDOT-RELEASES-FIRST-EVER-STRATEGIC-PLAN-FOR-CONNECTED-AND-AUTOMATED-VEHICLES>

9 Florida Department of Transportation, 2023. *Florida's Connected and Automated Vehicle (CAV) Initiative*. <https://www.fdot.gov/traffic/teo-divisions.shtm/cav-ml-stamp/connected-vehicles>

10 Maryland Department of Transportation, 2023. *Maryland's Connected and Automated Vehicle Program*. <https://cav.mdot.maryland.gov/>

11 Michigan Department of Transportation (2021, September). *Connected and Automated Vehicle Strategic Plan*. <https://www.michigan.gov/-/media/Project/Websites/MDOT/Travel/Mobility/Mobility-Initiatives/Connected-Vehicles/Documents/MDOT-CAV-Strategic-Plan.pdf?rev=004043b173e34b87adc7f0c8a8794ac4>

12 Minnesota Department of Transportation, 2023. *MnDOT's CAV strategic plan*. <https://www.dot.mn.gov/automated/destinationcav/strategicplan.html>

13 Pennsylvania Department of Transportation, 2023. *CAV Initiatives*. <https://www.penndot.pa.gov/ProjectAndPrograms/ResearchandTesting/Autonomous%20Vehicles/Pages/CAV-Initiatives.aspx#:~:text=The%20Strategic%20Plan%20will%20look,provide%20PennDOT%20with%20critical%20missing>

## INFRASTRUCTURE PLANNING & SAFETY

As preparations for AVs are advanced, the opportunity to consider ways to advance safety for all is enhanced. Planning and safety improvements to the infrastructure can be made now that will accommodate AV preparedness while also addressing current safety needs for all road users, creating efficiencies by applying investments to meet multiple needs.

### Possible Actions:

As infrastructure investments continue to be made, consider opportunities to also address the needs of AVs and emerging technologies so that investments can be bundled when appropriate.

- ▶ Identify opportunities for coordination of state and local investments that complement and support AV accommodation and also support the safety of the general motoring public so that all road users can benefit. Examples of infrastructure enhancements that could be invested in now for current road user safety as well as AV preparedness include:
  - » **Updating pavement markings:** Use consistent and clearer markings and reflectivity for AV technologies (e.g., LiDAR, cameras) to identify pavement markings and traverse roadways appropriately
  - » **Managed curb space:** Cities can define curb spaces within their jurisdiction, including applicable usage for various curb space areas. One AV use case managed curb space assists with is city-approved robotaxi pick-up/drop-off locations that reduces or removes potential road user safety for both the road user in the robotaxi as well as other road users that may traverse the defined area.
- ▶ Planning and investments should include coordination with local jurisdictions who maintain local roads, providing state collaboration and information sharing and support for local delivery of infrastructure investments.

**EXAMPLES:** Michigan DOT has focused on foundational Connected Autonomous Vehicles (CAV) investments that are adaptable and can be upgraded as appropriate, such as communications technologies and supporting infrastructure, data management tools, and wider striping and other updates in conjunction with larger construction projects.



## MULTI-STATE COORDINATION

Infrastructure investments to advance technology must consider interstate transportation and mobility needs and activities.

Investments in infrastructure to prepare for AVs must consider multi-state and regional efforts such as the Cascadia mega region and its interstate travel and commerce with neighboring states, jurisdictions, and British Columbia (BC). Multi-state coordination related to agency preparedness for AVs may include regional project planning, interstate engagement, shared funding opportunities, and coordinated AV pilots.

### Possible Actions:

Coordinate with neighboring states and BC to ensure common approaches for travel and interstate commerce.

- ▶ Leverage existing forums for coordination, such as the Federal Highway Administration's Transportation Pooled Fund Program, the Cascadia Innovation Corridor Partnership, and the Western Association of State Highway and Transportation Officials (WASHTO), where applicable, and if needed for proper collaboration on this topic, create additional or new forums to foster multi-state coordination.

**EXAMPLES:** The Mid America Association of State Transportation Officials (MAASTO) created a [2030 CAV Regional Strategy](#)<sup>14</sup>, committing the region to:

- ▶ Ongoing information sharing of best practices
- ▶ Collaborating on regional projects
- ▶ Developing a regional CAV strategy
- ▶ Hosting an annual summit

MAASTO, like WASHTO, is primarily comprised of State DOT representatives. Other organizations, like the Intelligent Transportation Society of America (ITSA) and the American Association of Motor Vehicle Administrators (AAMVA), could also be utilized to take a broader focus that includes other statewide agencies and partners.

14 Mid America Association of State Transportation Officials, 2023. *MAASTO 2030 CAV Regional Strategy*. <https://transportation.org/mobility/wp-content/uploads/sites/34/2023/01/MAASTO-CAV-Summit-Regional-Strategy1.pdf>

## AGENCY PREPAREDNESS THROUGH TRAINING

State agencies need to have the capabilities to continually stay apprised and informed of AV industry advancements. Keeping agency-level institutional knowledge current around AV technology and industry advancements help agencies build expertise in-house to improve the State's ability to prepare for and support needed oversight of AV operations, as well as to continually inform agency policies and procedures.

### Possible Actions:

Develop skillsets within state agencies to understand AV industry developments, regulatory requirements, and partnerships.

- ▶ Identify existing, and develop if needed, training opportunities and resources for state agencies which support their ability to remain current on technology and AV industry advancements.
- ▶ Establish state and local training information sharing mechanisms, including lessons learned from those that have or are currently testing or deploying AVs in their jurisdiction. Training will be ongoing, and as such, training resources and expectations will need to continue to evolve with AV advancements.

**EXAMPLES:** Maryland's ongoing [CAV Working Group](https://cav.mdot.maryland.gov/working-group/)<sup>15</sup> enables coordination between state agencies to develop plans, experience AV testing, hold educational and engagement workshops, and more.

National organizations offer AV-related educational resources, including FHWA, NHTSA, the CAT Coalition, PAVE, SAE, and IEEE, among others.

15 Maryland Department of Transportation, 2023. *Maryland's Connected and Automated Vehicle Program, Working Group*. <https://cav.mdot.maryland.gov/working-group/>

## PARTNERSHIPS

Collaboration and coordination with the AV industry technology developers, trade associations, and other public and private sector entities will support the state's efforts around building readiness and preparations for AV operations.

AV technology is still in its infancy stage and will change quickly. Intentionally cultivating strategic partnerships with industry and associations will support clear identification of needed actions, investment, and infrastructure needs to be addressed by the state, and will help build expertise within state agencies on an ongoing basis.

### Possible Actions:

Develop and further cultivate partnerships for strategic AV testing and investment in the state.

- ▶ Leverage existing state agency partnership programs and forums (such as the WSDOT Office of Public Private Partnerships or the Department of Commerce Innovation Partnership Zones) to develop and foster strategic private sector partnerships as well as partnerships with trade associations and other public sector entities within the AV and technology space to support the advancement of a methodical process of preparing for AVs.
- ▶ Direction for partnership cultivation should include:
  - » Defining partnership types, roles, and expectations
  - » Defining the value that partnership(s) provide for Washington and its public
  - » Partnership and collaboration with cities and counties
  - » Identification of opportunities to address a variety of AV impacts, such as workforce, infrastructure, equity, and safety

**EXAMPLES:** In Michigan, an [Office of Future Mobility and Electrification](https://www.michigan.gov/minewconomy/support-small-businesses/key-initiative)<sup>16</sup> was created in 2020 to support partnership development and direct investment across state government.

In 2020, the Jacksonville Transportation Authority [partnered with the Mayo Clinic](https://newsnetwork.mayoclinic.org/discussion/autonomous-shuttles-help-transport-covid-19-tests-at-mayo-clinic-in-jacksonville/)<sup>17</sup>, Beep, and NAVYA to deploy autonomous vehicles for transporting medical supplies and COVID-19 tests during the pandemic – highlighting a key benefit and use case of public/private partnerships and investment.

<sup>16</sup> Michigan Department of Transportation, 2022. *Key Initiative (567970), Michigan Office of Future Mobility and Electrification (OFME)*. <https://www.michigan.gov/minewconomy/support-small-businesses/key-initiative>

<sup>17</sup> Ford, T. R. (2020, April 2). *Autonomous Shuttles help transport COVID-19 tests at Mayo Clinic in Florida*. Mayo Clinic News Network. <https://newsnetwork.mayoclinic.org/discussion/autonomous-shuttles-help-transport-covid-19-tests-at-mayo-clinic-in-jacksonville/>



# AV BUILDING BLOCK: PUBLIC OUTREACH



# BUILDING BLOCK: PUBLIC OUTREACH



The operation of AVs in Washington has broad implications for a wide variety of people in the state. Information about AVs should be communicated to the public in a comprehensive, transparent, and inclusive way. Facilitating increased awareness of the technology will build broad trust and will support information sharing amongst stakeholders so lessons are learned together.

The level of exposure to emerging technologies like AVs and understanding of the impacts and/or benefits these technologies may vary across different communities within Washington. A robust, intentional, and ongoing public education process that is statewide and inclusive of all communities, will help the state gain understanding around the concerns and priorities of the public as AV operations expand in Washington State, enabling a proactive and informed policy development process that can inform the design and deployment of AV technology. Coordination of public outreach efforts with local agencies, community organizations, and advocacy groups will be essential to fostering trust within communities and ensure underrepresented populations are involved in the conversation.



## PUBLIC EDUCATION

As work continues to bring AV operations and deployment on Washington's public roadways, engagement with the public early and often, is key. Public education, input gathering, information sharing, and providing opportunities to safely experience AVs all enable an open and transparent public process that directly involves Washington State residents.

### Possible Actions:

Provide public education and outreach to advance understanding around the benefits and limitations of AV and related technologies (such as ADAS), to encourage safe, equitable, and effective deployment.

- ▶ Assign a lead state agency and authorize and resource them to develop a public AV outreach plan that could include statewide focus groups, surveys, etc.
- ▶ Direct the lead state agency to coordinate with local agencies, community organizations, and advocacy groups to develop and conduct public outreach efforts.
- ▶ At a minimum, the plan and its processes should include:
  - » An equity strategy that identifies approaches and processes for engaging underrepresented communities.
  - » The lead state agency should collaborate with other state-level and local agencies to clearly define roles in public outreach and education to execute the AV public outreach plan.
  - » Identification of opportunities to secure external funding resources, such as through federal grant programs, integration with existing public outreach campaigns, and collaboration with the AV industry, to support and expand public outreach and education efforts and provide efficiencies where able to reduce administrative burden.

**EXAMPLES:** The [Partners for Automated Vehicle Education \(PAVE\)](https://pavecampaign.org/)<sup>18</sup> maintains a database of automated vehicle related resources, including webinars and reports on AV policy, social impacts, technology, and terminology. This database provides resources the state can use to assist in educating the public on AV technology with existing materials collected from a broad range of stakeholders and invested entities, including academic institutions, agencies, and experts in the industry

The National AV Pooled Fund, led by DriveOhio, has an active engagement plan with private partners and public outreach through PAVE.

18 Partners for Automated Vehicle Education, 2023. *PAVE Campaign*. <https://pavecampaign.org/>

## COLLABORATION

Collaboration encourages an open and transparent conversation across interested parties to set deliberate and informed policy, preparing for AVs in a global conversation. Actively collaborating and engaging with other regulatory entities, industry organizations, academia, local agencies, community partners, and the Washington public provides Washington the opportunity to learn from others and determine the best approach(es) for the state's approach to AV preparation.

### Possible Actions:

Collaborate with partner states, state and local agencies, technology developers, national organizations, academia, community partners, and the Washington public to identify best practices, and identify consensus approaches to managing the operation of AVs.

- State agencies and policy makers should actively engage in dialogues with industry organizations, state and local agencies, community partners, academia, national organizations, and the Washington public through working groups, collaboration forums, conference attendance, conversations, and more, to stay informed on what's happening around the country and what WA can replicate as it works to prepare for AV operations.

**EXAMPLES:** Several states – such as [Massachusetts](#)<sup>19</sup>, [Texas](#)<sup>20</sup>, [Maryland](#)<sup>21</sup>, [Oregon](#)<sup>22</sup>, and [Wisconsin](#)<sup>23</sup> – had and/or currently have a state-level automated vehicle working group that convenes public, private, non-profit, community, advocate, and academic partners together to collaboratively share insights on automated vehicle technologies and their impacts.

19 Massachusetts Department of Transportation, 2023. *Self-Driving Systems in Massachusetts*. <https://www.mass.gov/self-driving-systems-in-massachusetts>

20 Texas Department of Transportation, 2023. *Connected and Automated Vehicles (CAV) Task Force*. <https://www.txdot.gov/about/programs/innovative-transportation/cav-task-force.html>

21 Maryland Department of Transportation, 2023. *Maryland's Connected and Automated Vehicle Program, Working Group*. <https://cav.mdot.maryland.gov/working-group/>

22 Oregon Department of Transportation, 2021. *Automated Vehicles*. <https://www.oregon.gov/odot/programs/pages/cav.aspx>

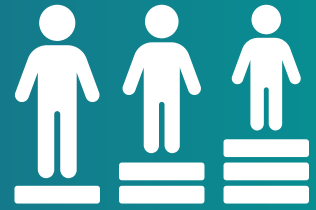
23 Wisconsin Department of Transportation, 2018. *Committee on Autonomous and Connected Vehicle Testing and Deployment*. <https://wisconsin.gov/Pages/about-wisdot/who-we-are/comm-couns/avcommittee.aspx>



# AV BUILDING BLOCK: EQUITY



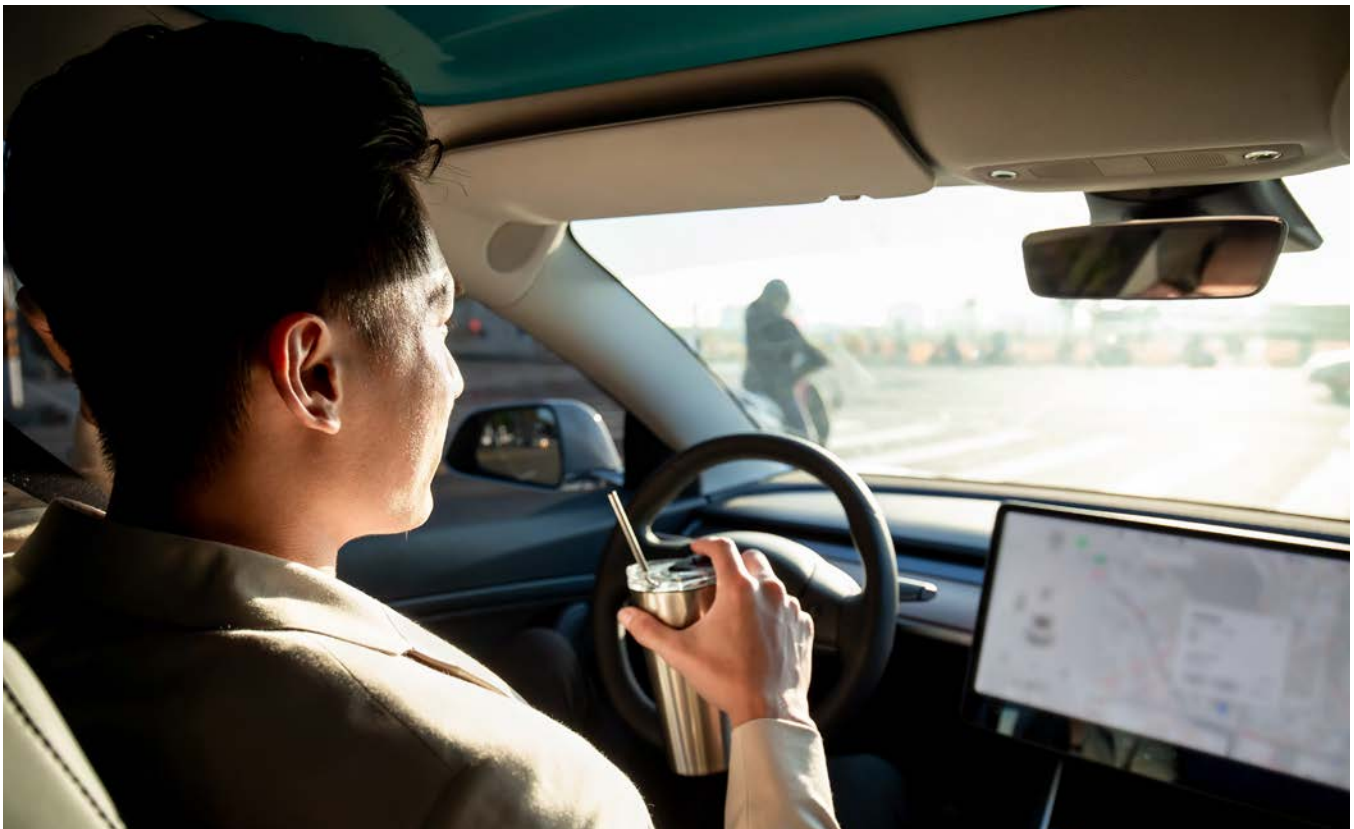
# BUILDING BLOCK: EQUITY



It is imperative that exploration into and implementation of AV technologies in Washington address potential health and equity impacts of AVs on its communities, that the health benefits of AV technologies are equitably distributed, and that negative impacts are not disproportionately borne by traditionally marginalized communities.

Consideration for and engagement with traditionally marginalized communities, including people of color and people in disinvested areas, is essential to better understand their communities' access, mobility, and health needs to ensure their needs are addressed in AV policies implemented in the state.

As decision makers continue to advance AV-related policy in Washington, it needs to ensure full and direct representation and participation of all that are affected by the policy.



## COMMUNITY MOBILITY NEEDS AND PRIORITIES

Communities have varied mobility needs and priorities based on their unique geographic and social makeup. Some communities may prioritize improvements to existing public transit and sidewalks before seeking improvements to facilitate AV testing and deployments that may only serve AV users rather than the community as a whole.

### Possible Actions:

Assess mobility priorities among communities, especially vulnerable populations.

- ▶ Resource efforts to conduct community mobility needs and priority assessments, including outreach and engagement with vulnerable populations, to ensure policies and improvements are meeting the needs of the community at large and reducing potential inequities.
- ▶ Education about AVs, including descriptions of potential future AV scenarios, should be included in community engagement efforts to inform persons who may have little knowledge about AVs.
- ▶ Relevant state and local level agencies, such as health and transportation departments, should be authorized and resourced to engage in these assessments, and should be directed to share findings across peer agencies and community partners.

**EXAMPLES:** The “[One Seattle Comprehensive Plan](https://engage.oneSeattleplan.com/en)<sup>24</sup>” development includes a community engagement process, prioritizing the voices of historically underrepresented communities to ensure inclusive neighborhood-level engagement. The City of Seattle provided funding to diverse community-based organizations to reach out to their members for input and incorporated that feedback in reports to the City.

24 City of Seattle, 2023. *One Seattle Comprehensive Plan Update Engagement Hub*. <https://engage.oneSeattleplan.com/en>

## ACCESS TO ALL NEIGHBORHOODS

Historically, some transportation services have not been equally implemented in marginalized and otherwise underserved communities, such as higher wait times and cancellation rates for ride-hailing services<sup>25</sup>. AVs have the potential to ensure equal service and improve accessibility in all communities and neighborhoods without bias.

AV technologies, algorithms, and processing engines must be designed to be equitable and inclusive and guard against inequitable service distribution to ensure accessibility and useability by all communities.

### Possible Actions:

Ensure access to AV services in all neighborhoods and communities.

- ▶ Review service areas and use of artificial intelligence training data from all areas to identify and remove potential discriminatory data collection methods, patterns, and outcomes. This effort requires collaboration among the AV industry, community, and public agency partners to ensure equitable outcomes and AV service offerings.

**EXAMPLES:** A study published in 2020 in the Annual Review of Public Health, [Autonomous Vehicles and Public Health](#)<sup>26</sup>, found that AVs could increase equitable impacts for disadvantaged populations, including increased accessibility to jobs and services.

The Smart Columbus program launched a [self-driving shuttle deployment in the Linden neighborhood](#)<sup>27</sup> to connect residents to community resources and public transit. Following an on-board incident during passenger operations, the shuttle was removed from operations. The COVID-19 pandemic impacted the ability to return to passenger vehicle service after safety revisions were implemented, and the Linden autonomous shuttle service was converted to a food pantry delivery service from July 2020 to April 2021, distributing almost 4,000 food pantry boxes to the community.

25 Ge, Y., C.R. Knittel, D. MacKenzie, S. Zoepf. *Racial and gender discrimination in transportation network companies* (No. w22776). National Bureau of Economic Research, 2016. [https://www.nber.org/system/files/working\\_papers/w22776/w22776.pdf](https://www.nber.org/system/files/working_papers/w22776/w22776.pdf)

26 Annual Review of Public Health, 2020. *Autonomous Vehicles and Public Health*. <https://www.annualreviews.org/doi/10.1146/annurev-publhealth-040119-094035>

27 Smart Columbus Program. *Self-Driving Shuttles*. 2023. <https://smartcolumbus.com/projects/self-driving-shuttles>

## BARRIERS FOR PERSONS WITH DISABILITIES

As stated by Disabilities Rights Washington in its 2019 presentation [to the Washington State Autonomous Vehicle Work Group](#)<sup>28</sup>, “we all need to get places.” Transportation accessibility for persons with disabilities varies widely, with barriers ranging from transit and shared vehicles not being wheelchair accessible, to accessible personal vehicles being limited and expensive. The introduction of AVs should reduce or remove such barriers.

### Possible Actions:

Address barriers to AV use by persons with disabilities.

- ▶ Require at least some AVs to accommodate wheelchairs and exceed ADA minimum standards.
- ▶ Identify potential barriers to AVs for persons with disabilities and establish policies and AV program requirements to implement solutions. Examples include requiring methods and assistive technology to interface with humans who interact with an AV, such as audible methods for blind and low vision persons and visual methods for deaf and hard of hearing persons.

**EXAMPLES:** The [Grand Rapids Autonomous Vehicle Initiative \(AVGR\)](#)<sup>29</sup> deployed a wheelchair accessible on-demand autonomous shuttle during its pilot operating 2019 to 2022. The pilot included a vehicle attendant who announced stops along the route when requested to help individuals with visual or hearing impairments.

Nevada passed [legislation in 2017](#)<sup>30</sup> that forbid autonomous transportation network companies (TNCs) from charging more for providing transportation to a person with a physical disability, required the TNC to provide a way for passengers to indicate they require a wheelchair accessible vehicle, and if the TNC is unable to provide wheelchair-accessible services the TNC must direct the rider to an alternative provider who can provide accessible services.

28 Carpenter, M., Link, V., Matthews, C., & Zivarts, A. (2019, June 28). *AV Impacts on the Disabled Community*. [https://oohwstcavworkgroup.blob.core.windows.net/media/Default/documents/executive-committee/Meeting\\_3/Meeting3%20Presentation.pdf](https://oohwstcavworkgroup.blob.core.windows.net/media/Default/documents/executive-committee/Meeting_3/Meeting3%20Presentation.pdf)

29 City of Grand Rapids. *Grand Rapids Autonomous Vehicle Initiative #AVGR*. 2023. <https://www.grandrapidsmi.gov/Government/Departments/Mobile-GR/Grand-Rapids-Autonomous-Vehicle-Initiative>

30 A.B. 69, 79<sup>th</sup> Legislature, 2017 Regular Session (Nevada 2017). <https://legiscan.com/NV/bill/AB69/2017>



## REMOVE BARRIERS TO AV ACCESS

High cost and lack of access to technologies and requirements for transportation services can reduce equitable access to AVs for persons with low incomes, the unbanked, and those without access to the technologies currently required to use some transportation services (e.g., smartphones, credit cards, etc.). These barriers reduce transportation options and, in turn, opportunities and access to goods and services.

AVs have the opportunity to reduce or remove these barriers, making AV services accessible to all, through various means such as: AV companies offering methods for cash payments for the unbanked; low, no, or supplemented payment options; and alternative methods for accessing/requesting AV services such as telephony services.

### Possible Actions:

Ensure access to AV services for persons with low income and/or lacking smartphones or credit cards.

- ▶ Evaluate and implement policies to require alternative options for access and payment of AV services to enable equitable access for all.
- ▶ Evaluation of policies includes engagement with impacted communities to understand current and expected barriers, coordination with state and local agencies to determine policy approaches and implications, and collaboration with community, advocacy, industry, and federal entities to define and implement effective, cohesive policies for equitable AV access and use without undue burden or unintended impacts.

**EXAMPLES:** TriMet transit services in the Portland, Oregon metropolitan area offers a [variety of ways to pay](#)<sup>31</sup> for transit services, including using cash to purchase a one-time or reloadable transit pass card. TriMet also offers a [reduced fare program based on income](#)<sup>32</sup>. AV transit services could implement similar payment options to remove barriers to those without access to a smartphone to use as a mobile transit pass, those without access to a credit card, and persons with low income.

31 TriMet. *Ways to Pay*. 2023. <https://trimet.org/fares/index.htm#waystopay>

32 TriMet. *Reduced Fare for Riders Who Qualify Based on Income*. 2023. <https://trimet.org/income/index.htm>

## SHARED AV PERSONAL SAFETY

Shared transportation services, including shared AVs, can provide many societal benefits, such as reduced vehicle miles traveled, congestion, and emissions. However, shared AVs could also introduce unintentional impacts, such as safety concerns for vulnerable riders who may rely on a human vehicle operator as a point of protection when sharing a vehicle with unknown individuals to protect from discrimination, unwanted advances, and harassment. Personal safety of riders in shared AVs must be paramount, and methods to protect that safety need to be identified, implemented, and enforced.

### Possible Actions:

Address barriers for shared AV use.

- ▶ Explore personal safety protection methods and protocols to be required in shared AVs operating on Washington's public roadways, including but not limited to:
  - » Emergency call buttons to remote operators or law enforcement for shared AV riders in an unsafe situation.
  - » Methods for shared AV rider matching and/or giving riders the ability to select ride share partners, such as single gender, to reduce concern for personal safety, while limiting the potential for discriminatory effects.

**EXAMPLES:** A research study published in 2022, "[You'll Never Ride Alone: Insights into Women's Security Needs in Shared Automated Vehicles](#)"<sup>33</sup>, included a workshop series to discuss implications of shared AVs' safety and security for a variety of groups, including women. Among the findings of these workshop discussions were methods to address safety and security concerns for women and other vulnerable populations in shared AVs, including information presented at time of booking, provision of a digital companion, implementing a 'buddy system' that allows buddy matching, and identifying where humans should be physically present (e.g., at the pickup and drop-off locations), or available via technology during the ride.

33 Schuss, M., Manger, C., Loecken, A., & Riener, A. (2022, September 17). You'll never ride alone: Insights into women's security needs in shared automated vehicles. <https://dl.acm.org/doi/fullHtml/10.1145/3543174.3546848>

## WORKFORCE DISRUPTION AND IMPACTS

Autonomous vehicle operations present long-term disruptions and impacts to the current and future workforce, with reduced need for commercial drivers – trucks, buses, taxi, and ride-hailing. These impacts may be experienced slowly in the short-term, however actions to address these coming changes should be started now to reduce future negative impacts. These changes can include implementing effective workforce transition services, retraining programs, providing job-matching and career counseling services for dislocated and at-risk workers, and coordinating with community and technical colleges to develop certification and credentialing programs for changing or new jobs presented with the introduction of AVs.

### Possible Actions:

Assess and address potential long-term disruptions to the current transportation job sector.

- ▶ Develop job retraining for workers who may lose jobs (e.g., bus, truck, taxi, and ride-hailing drivers).
- ▶ Establish collaborative partnerships with colleges to develop changing workforce programs to address those that could be impacted by AV shifts in workforce opportunities.
- ▶ Coordinate with worker organizations to implement job-matching and career counseling services for dislocated and at-risk workers.

**EXAMPLES:** In 2019, Pima Community College and self-driving truck company TuSimple developed the [first autonomous driving certificate program for truck drivers](https://www.pima.edu/news/press-releases/2019/201906-tu-simple.html)<sup>34</sup>, equipping truck drivers with skills and education to expand their role as the transportation industry shifts with the introduction of AVs.

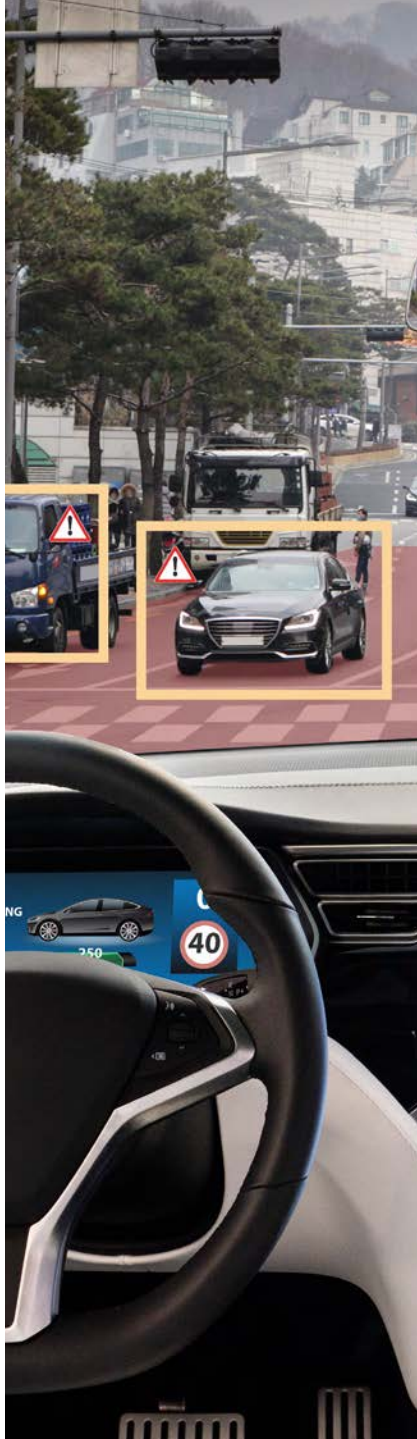
34 Pima Community College (2019, June 13). *TuSimple and PCC Announce Autonomous Vehicle Driver Program*. <https://www.pima.edu/news/press-releases/2019/201906-tu-simple.html>



# AV BUILDING BLOCK: SAFETY



# BUILDING BLOCK: SAFETY



AVs have the potential to increase safety and reduce injuries and fatalities related to vehicle incidents. There is likely to be a combination of AVs and human-driven vehicles on public roadways into the foreseeable future. Therefore, AVs will need to be designed to interact with human-driven vehicles safely and efficiently in the transportation system. AVs will also interact with all road users, including other vehicles on the roads and those outside of vehicles, such as pedestrians and bicyclists. Policies and expectations for AV operations and interactions with all road users is imperative to ensure safety for all.

The safety potential that AVs present is not guaranteed and will depend on what requirements are placed on developers as well as what infrastructure and tools are available to them, including engagement with and education for law enforcement and first responders, AV incident reporting and analysis, and ongoing monitoring of AV activities to improve safety-related legislative and operational policies.



## LAW ENFORCEMENT / FIRST RESPONDERS

Law enforcement / first responders (LE/FR) will directly interact with AVs as they respond to incidents and traffic violations. It is important for law enforcement and first responders to have knowledge of where AVs will be operating on public roadways, how to interact with the AV, how to disable or move off the roadway, etc. Direct engagement with LE/FR in the field and who have interacted with AVs is essential to identifying challenges, opportunities, and crucial protocols and policies for LE/FR interaction with AVs in Washington.

### Possible Actions:

Ensure that AV companies understand LE/FR needs before deploying. Ensure that LE/FRs understand how to interact with AVs.

- ▶ Require a LE/FR Interaction Guide that is developed in coordination with LE/FR and the AV company(ies) seeking to test/deploy, and either provided to the LE/FR in each jurisdiction where AV testing and/or deployment is occurring OR is centrally provided at the state-level, with state agency(ies) disseminating to localities.
- ▶ Directly engage with LE/FR across state and local agencies in the state to understand their needs and challenges for interacting with AVs.
- ▶ Coordinate with jurisdictions that have launched AV testing and/or deployments, as well as national guidance, to capture lessons learned and practical perspectives on LE/FR interactions with and protocols for AVs.

**EXAMPLES:** [Massachusetts](#)<sup>35</sup> requires AV companies applying to test in the state to prepare and make available a First Responders Interaction Plan to law enforcement agencies and other first responders operating in the permitted testing areas in the state, detailing how agencies interact with the AV in emergency and traffic enforcement situations.

[Arizona](#)<sup>36</sup> requires a Law Enforcement Interaction Plan from AV companies testing and operating without a safety driver present in the vehicle, which includes protocols on how law enforcement safely removes the AV from the roadway, information on what cities the AV is operating in, and how to safely tow the vehicle.

<sup>35</sup> Massachusetts Department of Transportation, 2023. *Testing automated driving systems in Massachusetts – Authorized testing on public roads*. <https://www.mass.gov/guides/testing-automated-driving-systems-in-massachusetts#-authorized-testing-on-public-roads>

<sup>36</sup> Arizona Department of Transportation Motor Vehicle Division, 2023. *Autonomous Vehicles Testing and Operating WITHOUT Driver*. <https://azdot.gov/autonomous-vehicles-testing-and-operating-without-driver>

## AV INCIDENT REPORTING AND ANALYSIS

Regularly occurring AV Incident reporting and analysis provides critical information to state agencies and regulatory bodies. The current process for AV permitting in Washington requires self-certified companies to submit an AV Collision Report every year, providing insight to the state on how self-certified AV companies' vehicles performed in the last year while testing on Washington's public roads. As AV operations increase, this type of reporting needs to happen more frequently and consistently.

Analyzing reported incidents can support the state's evaluation of the safety of AV operations and whether further action is needed. Possible further action could include but is not limited to: to discussing incidents and moving violations with the reporting AV company to determine root causes and potential mitigation measures; determining potential penalties if many or severe incidents are occurring; and identifying possible improvements to the AV permitting program in Washington to reduce incidents and moving violations to mitigate negative impacts and safety issues.

### Possible Actions:

Monitor AV testing and deployment activities to enable informed regulatory decision making and advance public safety.

- Develop requirements and a framework for incident reporting and incident analysis at the state level. Start with requiring the collection of information that is currently collected by [NHTSA](#)<sup>37</sup> and determine whether state-level reporting is needed to supplement.
- Use incident reporting information to develop and shape minimal risk and liability profiles and liability requirements for various deployment scenarios. For example, a low-speed, fixed-route AV shuttle that operates in a private campus will likely have a different risk profile and potentially different liability requirements than an AV that operates freely at varying speeds across multiple public roadway types (city street, rural road, state highway).
- Determine potential legal, operational, and/or financial penalties to assess an AV company operating in Washington if one of its AVs is responsible for the cause of a safety incident (e.g., collision with other vehicle).

**EXAMPLES:** Companies approved to test AVs in California need to [report](#)<sup>38</sup> any collision that resulted in property damage, bodily injury, or death within 10 days of the incident.

NHTSA has developed a [framework](#)<sup>39</sup> for automated driving system testable cases and scenarios.

37 National Highway Traffic Safety Administration, 2023. *Standing General Order on Crash Reporting*. <https://www.nhtsa.gov/laws-regulations/standing-general-order-crash-reporting>

38 California Department of Motor Vehicles, 2023. *Autonomous Vehicle Collision Reports*. <https://www.dmv.ca.gov/portal/vehicle-industry-services/autonomous-vehicles/autonomous-vehicle-collision-reports/>

39 National Highway Traffic Safety Administration (2018, September). *A Framework for Automated Driving System Testable Cases and Scenarios*. <https://www.nhtsa.gov/document/framework-automated-driving-system-testable-cases-and-scenarios>

## VULNERABLE ROAD USER SAFETY

The safety of vulnerable road users – pedestrians, cyclists, and others who use the road outside of a motor vehicle – must be actively considered and addressed in AV policy establishment. Vulnerable road users may be impacted by an AV at a crosswalk, curb, or other area of the infrastructure. The safety of all road users, but especially vulnerable road users, must be addressed and considered in all aspects of developing effective AV policy.

### Possible Actions:

Ensure AV operations on public roadways take mitigation measures to protect the safety of all road users, especially vulnerable road users.

- ▶ Conduct public outreach on all AV testing, pilot, or deployments to consider vulnerable road users, such as clearly defining AV operational design domains (environmental, geographic, traffic, and roadway characteristics and constraints where an AV will operate), identifying within the domain potential implications for vulnerable road users, and implementing proactive mitigation measures to remove negative impacts and ensure safety of vulnerable road users.
- ▶ Identify road safety related information, such as road signage, that will require improvements to clearly communicate presence of AVs and expectations of how road users may interact with an AV. This assists in communicating to road users outside of the AV to increase awareness and reduce potential safety impacts.
- ▶ Include a vulnerable road user safety evaluation in any incident reporting analysis to identify incidents and moving violations that involved or impacted vulnerable road user safety, and assess potential policy improvements to reduce vulnerable road user safety implications of AV testing and deployments.

**EXAMPLES:** The Automated Vehicle Safety Consortium, a program of the SAE Industry Technologies Consortia, developed [Best Practices for Interactions Between Automated Driving System Dedicated Vehicles \(ADS-DVs\) and Vulnerable Road Users \(VRUs\)](#)<sup>40</sup> in 2022. This best practices report outlines expectations and challenges for how automated vehicles may interact and communicate with vulnerable road users to help ensure safe interactions.

The UDOT Automated Shuttle Project included many roadside signs to communicate with road users outside the automated shuttle, like the one shown on the left.



FIGURE 1 | Utah Autonomous Shuttle Pilot Roadside Sign

40 Automated Vehicle Safety Consortium, 2022. *AVSC Best Practice for Interactions Between ADS-DVs and Vulnerable Road Users (VRUs)*. SAE Industry Technologies Consortia. <https://www.sae.org/news/press-room/2022/08/avsc-vru-best-practice>

## DATA AND CYBERSECURITY

AVs are rolling computers, transmitting and receiving data in real-time, necessitating the need for strong cybersecurity and data protection requirements. Data security and privacy is crucial to ensure that the technology itself is sound and stable, data is secure, privacy of any and all users is protected, confidentiality and integrity is upheld, and ultimately that AVs do not introduce undue cyber harm.

### Possible Actions:

Safeguard the security and privacy of data and communications related to AVs, especially in safety-critical situations.

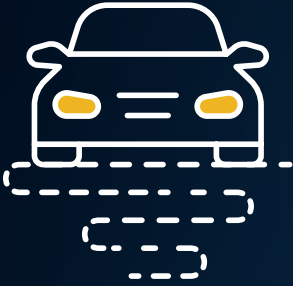
- ▶ Support and pursue initiatives that focus on data management, data security, data privacy, and cybersecurity, including network security for remote operations and policies related to personally identifiable information.
- ▶ Direct agencies executing or supporting these initiatives to leverage industry best practices and fill in the gaps as needed to achieve data privacy and data sharing standards for all data collected by or shared with the State.
- ▶ Require AV companies operating in Washington to comply with state and federal cybersecurity and data privacy laws. AV data and cybersecurity efforts must include direct coordination with the Washington Technology Solutions (WaTech) agency and, where applicable, local security and privacy agencies.
- ▶ Enable pathways for data sharing agreements among agencies and AV companies where appropriate for safe and efficient operations while protecting data security and personal information.

**EXAMPLES:** The U.S. Cybersecurity & Infrastructure Security Agency (CISA) developed the [Autonomous Ground Vehicle Security Guide](https://www.cisa.gov/resources-tools/resources/autonomous-ground-vehicle-security-guide)<sup>41</sup> in 2021 to provide transportation systems sector partners a framework to better understand and mitigate cyber threats for AVs. This guidance is directed towards the industry, and represents the types of resources for state and local agencies to be aware and apprised of when considering state and local level data and cybersecurity policies for AV operations.

The U.S. DOT's [Work Zone Data Exchange \(WZDx\)](https://www.transportation.gov/av/data/wzdx)<sup>42</sup> initiative enables infrastructure owners and operators (IOOs) to make work zone data available for third party use, such as automated technology providers to help automated driving systems, as well as human drivers, navigate more safely.

41 Cybersecurity & Infrastructure Security Agency, 2021. *Autonomous Ground Vehicle Security Guide: Transportation Systems Sector*. <https://www.cisa.gov/resources-tools/resources/autonomous-ground-vehicle-security-guide>

42 U.S. Department of Transportation, 2023. *Work Zone Data Exchange (WZDx)*. <https://www.transportation.gov/av/data/wzdx>



# AV BUILDING BLOCK: TESTING & PILOTS

# BUILDING BLOCK: TESTING & PILOTS



As AV technologies continue to evolve, and the state continues to evaluate potential policy approaches to enabling the safe operation of AVs on Washington’s roadways, AV testing and conducting pilots provides the opportunity to experience AVs in a real-world environment to better understand how AVs operate, the benefits they may bring, and the impacts and implications they may introduce.

Several jurisdictions across the country have conducted AV testing and pilots and shared their lessons learned with the AV Work Group, which included Utah, Minnesota, Michigan, California, Arizona, and the City of Seattle. Conducting AV testing and pilots in Washington would allow the state to:

- ▶ Provide the public with the opportunity to have first-hand experience AV technology and services, building a better understanding and awareness of these technologies.
- ▶ Enable the exploration of various operational considerations unique to Washington State as it prepares for future AV deployments, such as unique geographic, socioeconomic, and equity considerations and policy approaches.
- ▶ Identify approaches to increase equitable access, such as leveraging AVs to provide services in disadvantaged communities and close transit gaps in underserved communities.
- ▶ Better understand agency capabilities and limitations, training and partnership opportunities, and policy and organizational needs.

Through AV testing and pilots, the state and its localities can learn valuable lessons and increase its knowledge base of AV technologies, services, benefits, impacts, and opportunities to evolve its regulatory approach to prepare for safe AV operations.



## PILOTS

A state-led pilot, as well as supporting other pilot activities at the local level, enables Washingtonians and the state to experience AVs in a real-world environment unique to our state, and can support evaluation of potential policies, regulations, processes, and decisions prior to AV deployment.

### Possible Actions:

Provide the public first-hand experience with AVs, enable the exploration of possible operational considerations unique to Washington in preparation for future AV deployment, and identify approaches to harnessing AV opportunities that increase equity and access.

- Conduct a state-sponsored and managed AV pilot project in multiple locations statewide.
- Direct and resource a state lead agency to define the pilot service plan and locations, identify and coordinate with agency partners, secure and manage industry partners, and oversee pilot operations.
- The state-sponsored pilot should focus on serving the public good, providing pilot services that support expanding public awareness, gathering of public input on needs that AV services could address, and identifying opportunities and hurdles for increasing equitable access to AVs. More information on a potential structure for a state-sponsored AV pilot is detailed in the [AV Work Group's 2022 Annual Report](#)<sup>43</sup>.
- Explore agency resourcing, program structure, and external funding opportunities for a state-led grant program to encourage local municipalities and/or companies to manage their own AV projects.

**EXAMPLES:** Utah DOT partnered with UTA for an [automated shuttle pilot project](#)<sup>44</sup> that provided passenger service at 8 locations over 17 months. Experiencing the technology first-hand resulted in increased AV understanding and trust.

Minnesota DOT created the [CAV Challenge](#)<sup>45</sup>, an open and rolling procurement for public and private entities to propose CAV solutions to improve safety, efficiency, equity, and mobility. State leaders have funded 10+ projects totaling over \$5.5 million.

Minnesota's [first AV shuttle deployment](#)<sup>46</sup> was a three-day demo during the Super Bowl, focusing on public engagement, including signage, flyers, and two staff on board to answer questions.

43 Washington State Autonomous Vehicle Work Group, 2022. *2022 Annual Report to the Governor and Legislature*. [https://oohwstcavworkgroup.blob.core.windows.net/media/Default/documents/annual-reports/WSTC\\_AVWG\\_November\\_2022\\_Annual\\_Report.pdf](https://oohwstcavworkgroup.blob.core.windows.net/media/Default/documents/annual-reports/WSTC_AVWG_November_2022_Annual_Report.pdf)

44 Utah Department of Transportation & Utah Transit Authority, 2022. *Utah Autonomous Shuttle Pilot*. <http://www.avshuttleutah.com/>

45 Minnesota Department of Transportation, 2023. *Minnesota's CAV Challenge*. <https://www.dot.mn.gov/automated/destinationcav/mncavchallenge.html>

46 Minnesota Department of Transportation (2018, June). *MnDOT Autonomous Bus Pilot Project: Testing and Demonstration Summary*. <https://www.dot.state.mn.us/automated/bus/finalreport.pdf>

## AV TESTING LESSONS LEARNED

AV testing lessons learned can inform regulation, policy, operational procedures and considerations, and many other aspects of AV preparation. Whether lessons are learned through Washington's direct involvement in AV testing and pilots, or through the learnings from other jurisdictions, these important findings can lead to more informed and comprehensive decision making.

### Possible Actions:

Document learnings from testing activities in-state to inform policy making and future AV deployment. Stay informed of lessons learned from Washington's cities and other states' testing and pilot activities to further inform decision makers.

- ▶ Direct the State Transportation Commission to develop a lessons learned inventory from Washington's cities and other states' AV testing efforts and activities.
- ▶ Direct the state agency(ies) responsible for leading AV pilots in Washington, or monitoring AV testing activities, to document and share lessons learned from AV testing and pilots with peer state agencies, local agencies, lawmakers, and other states to continue building on AV lessons learned across the country.

**EXAMPLES:** The Utah AV shuttle pilot program included extensive [lessons learned](#)<sup>47</sup> which outlined infrastructure needs, policy requirements, and user experience findings related to the pilot effort.

During its purview, the Washington State AV Work Group invited several jurisdictions (Utah, Arizona, California, Michigan, etc.) to share their experiences and lessons learned in AV testing and pilot initiatives. These lessons learned are documented in the Work Group's Annual Reports.

<sup>47</sup> Utah Department of Transportation & Utah Transit Authority, 2021. Utah Autonomous Shuttle Pilot Final Report. <https://www.dot.state.mn.us/automated/bus/finalreport.pdf>



# AV BUILDING BLOCK: PATH TO DEPLOYMENT

# BUILDING BLOCK: PATH TO DEPLOYMENT



AV deployment allows companies to move from testing their technologies to commercially operating AVs on public roads by members of the public, with AV companies selling or leasing AVs or provide AV services to the public for a fee. This introduces another layer of regulatory needs as AV operations is expanded to commercial use by the public and not just for use by the AV company's employees, contractors, or designees, as it is during testing.

Current laws and regulations in Washington State explicitly allow AV testing, but do not explicitly allow operational AV deployments. As the state continues to prepare for the safe operation of AVs, it needs to define what is needed to allow for and support full AV deployment in Washington.

A clear path to AV deployment sets forth what the AV industry needs to do to operate in Washington, including explicit permission for operational deployment in law. This requires the establishment of clear expectations and regulations, as well as setting forth a clear governance structure for operational oversight. The challenge is to find balance between regulation compliance and safety, while also encouraging industry innovation.

Close coordination among state and local agencies, the AV industry, community organizations, advocacy groups, academia, and other interested parties will be important to ensure the definition of a clear path deployment considers all perspectives to develop an efficient and effective regulatory approach to the safe operation of AVs in the state.



## DEFINE A CLEAR PATH TO DEPLOYMENT

### Possible Actions:

In addition to public outreach and education, moving to AV operations and deployment will require active engagement with the AV industry. Engaging with the industry can assist in making sure the State's AV-related decisions do not stifle innovation nor prevent sound AV technologies from being tested and deployed in Washington.

Provide clear expectations of regulatory agencies, supporting entities, and companies deploying AVs in Washington.

- ▶ Washington's regulations do not currently define a clear path to deployment, nor do interested parties necessarily agree on what a clear path to deployment will entail. Assign and resource a lead state agency to coordinate across decision makers, peer agencies, community partners, and AV industry partners to define what a "clear path to deployment" means in Washington State. This effort should leverage other states' AV policies to align where applicable to reduce a patchwork of policy.
- ▶ This effort should consider an approach that reduces a "patchwork of regulation" across other jurisdictions, while still maintaining local jurisdiction autonomy. This effort must also acknowledge that not all AV deployments will serve the same purpose or require the same level of regulation or oversight (e.g., low-speed fixed-route AV shuttles' regulatory requirements and needs may vary widely from a free-roaming, high-speed AV operating on state highways during peak traffic hours).
- ▶ State regulations and laws must be based upon the evaluation of various AV deployment scenarios and technology approaches and arriving at an understanding of how those may impact regulatory structures and their implications.

**EXAMPLES:** The Texas A&M Transportation Institute published research for the "[Paths of Automated and Connected Vehicle Deployment: Strategic Roadmap for State and Local Transportation Agencies](https://tti.tamu.edu/tti-publication/paths-of-automated-and-connected-vehicle-deployment-strategic-roadmap-for-state-and-local-transportation-agencies/)"<sup>48</sup>. The research proposed two pathways that jurisdictions could take – Revolutionary and Evolutionary.

- ▶ In the Revolutionary Path, the private sector pushes technologies to the market through research and development investments, with regulatory and policy issues not hindering progress.
- ▶ In the Evolutionary Path, policies and regulations slow testing and deployment while taking a deliberative approach, with the private sector making incremental improvements in advanced driver assistance systems.
- ▶ The Revolutionary Path takes a light-regulatory approach with the industry leading the charge, while the Evolutionary path takes a heavier-regulatory approach with jurisdictions regulating how and when AVs can be deployed.

Arizona and California, among other states, explicitly state that AVs can be deployed in their respective states, with parameters as to how, when, and where an AV can be deployed in an operational manner.

48 Zmud, J., Tooley, M., Baker, R.T., Wagner, J.A. (2015, September). *Paths of Automated and Connected Vehicle Deployment: Strategic Roadmap for State and Local Transportation Agencies*. <https://tti.tamu.edu/tti-publication/paths-of-automated-and-connected-vehicle-deployment-strategic-roadmap-for-state-and-local-transportation-agencies/>

## MONITOR AND ADDRESS CHANGES AT THE FEDERAL LEVEL

Federal agencies continue to explore and provide guidance on AV regulation at a national level. They also have started to develop guidance for state-level regulatory approaches, such as the [AASHTO CAV Policy Principles](#)<sup>49</sup>, which provide states with guidance on how to move in the same direction as other states to encourage a national approach and reduce a regulatory patchwork across states.

As Washington continues to advance its AV policies, it needs to stay apprised of what is happening at the federal level of AV regulation and advancement and react appropriately to address state-level policy and operational approaches to AV operations.

### Possible Actions:

Monitor AV policy activity happening at the federal level and take action as needed in state policy when AV policies shift nationally.

- Assign and resource a state agency to monitor activity happening at the federal level for AV policy, regulation, and operational approaches. Direct the assigned lead agency to keep apprised of and communicate with decision makers and peer agencies federal shifts in AV policies and approach.
- The lead agency should engage in national organizations and discussions where applicable to advocate for federal standards and policies related to safe AV performance and regulation. If needed, the lead agency should coordinate with other agencies and local jurisdictions when applicable to adjust policies in the state's purview to align with shifts in federal activity.

**EXAMPLES:** The Pennsylvania DOT, along with the Department of Community and Economic Development, hosts an [annual Automated Vehicle Summit](#), where department secretaries and industry leaders present recent findings and actions affecting automated vehicle policy, including activity and changes at the federal level.

The National Conference of State Legislatures (NCSL) hosts an [Autonomous Vehicles Legislative Database and associated reports](#)<sup>50</sup> that includes information on what federal action is being taken year to year.

49 American Association of State Highway and Transportation Officials (2021, October). *AASHTO Connected and Automated Vehicle Policy Principles*. <https://transportation.org/cav/wp-content/uploads/sites/81/2023/05/CAV-Policy-Principles-v4-press1-2.pdf>

50 National Conference of State Legislatures, 2020. *Autonomous Vehicles – Self-Driving Vehicles Enacted Legislation*. <https://www.ncsl.org/transportation/autonomous-vehicles>



## LOCAL REGULATION

Local regulation enables local jurisdictions in Washington to set their own restrictions and regulations. To ensure a level of core consistency across the state, there is a need for foundational statewide regulations and policies for AV operations, while still enabling local jurisdictions to address their unique needs and objectives.

### Possible Actions:

Actively collaborate with and support local-level AV policy, regulation, and testing and deployment activities, to foster a statewide approach to AVs while supporting the independent need for addressing local objectives and needs.

- ▶ Assign and resource a lead agency to maintain ongoing coordination and collaboration with counties and cities in Washington to act in concert when conducting AV research, policymaking, and/or testing and deployments. This coordination includes identifying consistent approaches across counties and cities, where applicable, coordinating public communication and messaging, leveraging lessons learned from other localities, etc.

**EXAMPLES:** [Smart Columbus AV shuttle project](#)<sup>51</sup> team members initially pursued City of Columbus approval for microtransit operators. However, during this process, it was determined that registering with the Public Utilities Commission of Ohio instead would enable them not to have to pursue licensure at the city level, because the state's permit supersedes that of the city. The state's license was easier to receive, however the back-and-forth of the process led to delays.

51 Smart Columbus Program, 2023. *Self-Driving Shuttles*. <https://smartcolumbus.com/projects/self-driving-shuttles>

# CONCLUSION



As Washington continues to prepare for safe AV operations on the state's public roads, decision makers need to build a plan that will advance Washington State into the future of transportation and mobility. Because technology and AVs are a continually evolving sector, we must continue to explore the opportunities, challenges, impacts, and implications AVs introduce, and what policies and operational approaches and improvements can be made to address them.

Decision makers should identify opportunities and forums for continued collaboration on AV policy in the state, as was fostered through the AV Work Group during its purview, to bring the right mix of public, private, and community partners together for a variety of perspectives and expertise are at the table when evaluating the potential benefits and impacts each of the topics discussed may introduce.

There is no one approach that will prepare Washington for AV operations. The topics for further consideration presented in this report demonstrates the complexity of this subject, necessitating careful and deliberate evaluation of these topics, including implications one action may have on another, to ensure comprehensive and balanced AV policy is established in Washington.

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