WASHINGTON STATE
AUTONOMOUS VEHICLE
WORK GROUP

Infrastructure & Systems Subcommittee

Cooperative Automated Transportation (CAT) Policy Framework

Finalized

December 2020

For questions or suggestions, please contact Infrastructure and Systems Subcommittee staff

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Introduction

Autonomous vehicles (AVs) and related technologies, such as Connected Vehicles (CVs) and Advanced Driver Assistance Systems (ADAS), are emerging technologies that are being tested and introduced into the vehicle fleet nationally and in Washington State. The Washington State Transportation Commission (WSTC) has a legislative mandate to prepare for the changing mobility landscape in the State of Washington.

Legislative Mandate

Current law (RCW 47.01.510[1], expires December 31, 2023) directs the WSTC to appoint and convene an executive and legislative Work Group to gather information and develop policy recommendations to address the operation of AVs on public roadways in the State of Washington. The Work Group and the WSTC are charged with taking into account the transportation system policy goals established in RCW 47.04.280(1)[2] and doing the following:

- Follow developments in AV technology, AV deployment, and related policies (including regulatory tools) for autonomous passenger and commercial vehicles.
- Explore approaches to modify state policy, rules, and laws to further public safety and prepare the state for the emergence and deployment of AV technology.
- Share information on AV technology and policies with all interested stakeholders.
- At the direction of the legislature, engage the public through surveys, focus groups, and other such means, to inform policymakers for the purposes of policy development.
- Develop and update recommendations annually based on the input provided by the work group and provide a report to the governor and the relevant committees of the legislature by November 15th of each year.
- Identify proposed modifications to state law and rules to address the emergence and deployment of AV technology in the state.

The AV Work Group convened seven subcommittees to assess challenges and needs and generate recommendations for the Executive Committee to consider. These subcommittees are: Licensing, Liability, Infrastructure & Systems, Safety, System Technology & Data Security, Workforce, and Health & Equity.

[1] RCW 47.01.510 Autonomous Vehicle Executive and Legislative Work Group https://app.leg.wa.gov/RCW/default.aspx?cite=47.01.510

[2] RCW 47.04.280(1) Transportation system policy goals https://app.leg.wa.gov/RCW/default.aspx?cite=47.04.280

Infrastructure & Systems Subcommittee

The Infrastructure & Systems Subcommittee is charged with exploring transportation system issues as they relate to AVs and Cooperative Automated Transportation (CAT), such as roadway infrastructure, traffic management, transit, right of way, multi-modal transportation, Mobility-as-a-Service (MaaS), and Mobility on Demand (MOD). The Washington State Department of Transportation (WSDOT) is the lead agency for the Infrastructure & Systems Subcommittee.

The Infrastructure & Systems Subcommittee is also focused on:

- How AVs and AV policy fold into the overarching Washington State Transportation System Goals, established in RCW 47.04.280(1) for the planning, operation, performance of, and investment in, the state's transportation system, and
- A statewide CAT Policy Framework that includes automated, connected, electrified, and shared mobility to support a holistic, safe, and efficient multimodal transportation system.

Cooperative Automated Transportation

Cooperative Automated Transportation (CAT) enables all modes of transportation to work together through interdependent vehicle and systems automation and information exchange. CAT is intended to improve safety, mobility, and operations efficiency. CAT is inclusive of all:

- modes, (e.g. automobile, truck, plane, van, bus, rail, ferry, bicycle, scooter, pedestrian, etc.)
- systems (e.g. vehicles, infrastructure, information, communications, etc.), and
- applications (e.g. traffic management, fare collection, mobility services, trip planning, etc.).

Infrastructure owner-operators (such as WSDOT) will play a fundamental role in advancing, operating and maintaining the physical and digital infrastructure and public mobility services.

Connected and Autonomous Vehicles (CAVs) are manufactured vehicles of all classes[3] and levels of automation that are operated and connected within a CAT environment. CAVs could be used in a CAT environment for purposes including, but not limited to, personal transportation, freight, transit, passenger transportation, and mobility services.[4]

The Society of Automotive Engineers (SAE International) issued J3016B[5], a taxonomy and list of definitions for AV systems, which defines six levels of driving automation, designated as Level 0 through Level 6. Levels 0-2 describe driver support features or ADAS, while Levels 3-5 describe automated driving features. While Level 3+ AVs are still under active development and may be tested[6] in Washington State, passenger and commercial vehicles with ADAS systems are present in an increasing number of personally-owned and commercial vehicles today. Other technology-immersed transportation modes are also now present in Washington State, including MOD and MaaS technologies

[3] See: WAC 308-96A-099 https://app.leg.wa.gov/WAC/default.aspx?cite=308-96A-099

[4] Definition modified from Infrastructure Owner Operators Guiding Principles for Connected Infrastructure supporting Cooperative Automated Transportation https://wstc.wa.gov/Meetings/AVAgenda/Documents/documents/20190614_CATIOO_GuidingPrinciples.pdf

[5] SAE International Ground Vehicle Standard J3016_201806 https://saemobilus.sae.org/content/j3016_201806

[6] Autonomous vehicles: Self-certification for testing in Washington state https://www.dol.wa.gov/vehicleregistration/autonomous-self-cert.html

such as ride-hailing (e.g. Uber and Lyft services), shared bicycles (e.g. Jump bikes), and motorized foot scooters (e.g. Lime scooters).

Technology is changing the transportation landscape by affecting:

1. The physical transportation infrastructure through Intelligent Transportation Systems (ITS),
2. Private and commercial vehicles through ADAS, CV, and AV technology, and
3. How individuals and businesses service their mobility needs through MaaS and MOD.

CAT considers all three technology thrusts that will influence the future of transportation in Washington State. CAT includes both cooperation (i.e. individuals or modes of transportation work in concert to provide travelers a range of safe, sustainable, and integrated mobility choices) and automation (i.e. some or all of the functions of mobility, such as driving, payments, traffic management systems, and enforcement are automated). Based on the direction established by the Legislature and input gathered from internal and external partners, the Infrastructure & Systems Subcommittee is developing a CAT policy framework to guide the use and application of this technology.

Development of the Draft CAT Policy Framework

Appendix 2 describes the genesis of this Draft CAT Policy Framework. The policy goal statements were reviewed and endorsed by both the AV Work Group and the WSTC in the fall of 2019. The formally adopted policy goal statements are:

1. ***Organize for Innovation***: Enable organizational change that empowers officials to be flexible, accelerate decision-making, and adapt to changing technology.
2. ***Shared Mobility***: Encourage and incentivize shared mobility, including an emphasis on high occupancy and shared modes for moving people and goods.
3. ***Economic Vitality and Livability***: Create resilient and efficient regional networks and empower local agencies to create resilient, multimodal local networks.
4. ***Infrastructure and Context Sensitive Street Design***: Promote durable, physical and digital networks that accommodate the movement of people and goods in ways that are appropriate for the context.
5. ***Land Use***: Encourage land use development patterns that support multimodal connectivity to efficient local and regional networks.
6. ***Equity***: Work with marginalized communities to increase access to desirable mobility options.
7. ***Safety***: Increase the safety of transportation systems and infrastructure to support the safe movement of people and goods.
8. ***Environment***: Reduce the local and cumulative environmental impacts of mobility to improve air and water quality, energy conservation and mitigate climate change.

The subcommittee then continued to develop related strategies and actions as part of its 2020 Action Plan. In April of 2020, the subcommittee conducted a statewide workshop to gather additional input. This resulted in a comprehensive inventory of strategies and actions that support the eight policy goals (see pages 5-23). Special attention was given to align with the Washington State Legislature's transportation system policy goals (RCW 47.04.280), which are included in Appendix 1 for reference.

Definitions

Micromobility: An emerging mode that encompasses a vast collection of active transportation devices. Examples are motorized foot scooter, bicycles, electric bicycles (or eBikes), and electric skateboards. Micromobility devices are often rented via smartphone apps, a practice called MaaS.[7]

Mobility: The movement of people and goods between destinations, for private or commercial purposes, using a range of public and private modes.

Mobility as a Service (MaaS): A term most often used in Europe. As defined by the European MaaS Alliance[8], MaaS is the integration of various forms of transport services into a single mobility service accessible on demand. To meet a customer's request, a MaaS operator facilitates a diverse menu of transport options, be they public transport, ride-, car- or bike-sharing, taxi or car rental/lease, or a combination thereof. For the user, MaaS can offer added value through use of a single application to provide access to mobility, with a single payment channel instead of multiple ticketing and payment operations.

Mobility on Demand (MOD): A term most often used in the US. As defined by the U.S. Department of Transportation, MOD is an innovative, user-focused approach which leverages emerging mobility services, integrated transit networks and operations, real-time data, connected travelers, and cooperative Intelligent Transportation Systems (ITS) to allow for a more traveler-centric, transportation system-of-systems approach, providing improved mobility options to all travelers and users of the system in an efficient and safe manner.[9]

Multimodal: More than one public or private mode of transportation.

Networks: Interconnected infrastructure that supports uninterrupted mobility.

Resilient: Ability to adapt to and reduce the magnitude and/or duration of disruptive events. There are three areas of focus for resilient infrastructure:

1. Incidents, such as traffic collisions or cyberattacks on digital networks.
2. Climate change, e.g. extreme weather events, wildfires, more intense heat and cold cycles.
3. Wear-and-tear from intended operational use, e.g. fatigue, rutting.

Shared Mobility: Using a shared vehicle for mobility. A shared vehicle may be a public or private transit vehicle (e.g. light rail car, bus, private shuttle) or a vehicle of any type accessed using MOD or MaaS.

Smart Growth: Smart growth is a way to build cities, towns, and neighborhoods that are economically prosperous, socially equitable, and environmentally sustainable.[10]

Stakeholders: For the purposes of sharing information on AV technology and policies, interested stakeholders include, but are not limited to: public agencies, industry, academia, law enforcement, emergency responders, and the public.

Systems: Vehicles, infrastructure, information, communications, etc.

[7] See also Taxonomy and Classification of Powered Micromobility Vehicles: https://saemobilus.sae.org/content/J3194_201911/
[8] See: https://maas-alliance.eu/
[9] Definition from https://www.modalliance.org/
[10] Definition from https://smartgrowthamerica.org/

Strategies & Illustrative Actions Inventory

The following pages describe the strategies and illustrative actions that support the eight policy goals. This listing represents an inventory of possible strategies and actions that subcommittee and partner agencies may consider pursuing and further develop in more detail. Each could serve as a starting point to allow further exploration, scoping, and possible implementation to support the respective policy goal.

Unlike the policy goals, these strategies and actions were not formally adopted nor prioritized. Rather, they reflect a comprehensive effort and a significant level of input from a diverse set of private and public sector partners and are inclusive of all ideas submitted. (Please see Appendix 2 for a detailed description of the development process.)

Acronyms and Terms Referenced in Strategies & Actions:

Term	Definition
5G	Fifth generation technology standard for cellular networks
AAMVA	American Association of Motor Vehicle Administrators
AASHTO	American Association of State Highway Transportation Officials
ADA	Americans with Disabilities Act
ADAS	Advanced Driver-Assistance Systems
AV	Automated Vehicle
BAT	Business and Transit
CAT	Cooperative Automated Transportation
CCTV	Closed Circuit Television
CRCS	Connected Road Classification System
GHSA	Governors Highway Safety Association
GIS	Geographic Information System
HOT	High Occupancy Tolling
HOV	High Occupancy Vehicles
ISO	International Organization for Standardization
IT	Information Technology
MaaS	Mobility-as-a-Service
MOD	Mobility on Demand
MPO	Municipal Planning Organization
MUTCD	Manual on Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Program
OEM	Original Equipment Manufacturer
PRA	Public Records Act
RCW	Revised Code of Washington
RPO	Regional Planning Organization
SAE	Society of Automotive Engineers
SEPA	State Environmental Policy Act
TNC	Transportation Network Company
V2X	Vehicle-to-Everything
VMT	Vehicle Miles Traveled
WAC	Washington Administrative Code

1. Organize for Innovation

Enable organizational change that empowers officials to be flexible, accelerate decision-making, and adapt to changing technology.

Strategy Number	Strategy	Action	Legislative Goals Addressed*
**Transportation System Policy Goals RCW 47.04.280(1):* *1) Economic Vitality, 2) Preservation, 3) Safety, 4) Mobility, 5) Environment, 6) Stewardship*			
01	Share knowledge with external partners.	1-A) Maintain active participation in the American Association of State Highway Transportation Officials (AASHTO) CAT Coalition, which is a national network to address critical program and technical issues associated with the nationwide deployment of connected and automated vehicles on streets and highways. Encourage sharing of materials and updates at regular intervals through online or in-person forum(s). 1-B) Maintain active participation in the Governors Highway Safety Association (GHSA) and the Association of American Motor Vehicle Administrators (AAMVA), who have autonomous vehicle working groups and are striving to develop standards for issues related to AVs. Encourage sharing of materials and updates at regular intervals through online or in-person forum(s). 1-C) Join the 5G Automotive Association to monitor industry activity. Encourage sharing of materials and updates at regular intervals through online or in person forum(s). 1-D) Identify a list of national organizations, workgroups, committees, etc. to intentionally partner with and engage in a continued meaningful way with a list of public and private organizations that should consider engaging in each opportunity. Encourage sharing of materials and updates at regular intervals through online or in-person forum(s).	Economic Vitality, Safety, Stewardship
02	Adopt an organizational structure that can meet the needs of the next ten years.	2-A) Establish employee positions dedicated to innovation with authority over dedicated operating and capital funds and flexibility to engage partnerships.	Stewardship

Strategy Number	Strategy	Action	Legislative Goals Addressed*
		2-B) Provide access to training that prepares agency staff to plan, program, manage, maintain, and operate new systems and infrastructure. 2-C) Delineate the responsibilities between federal, state, MPO and local agencies. Identify the responsible party for implementing the policy. 2-D) Identify a list of core technical competency skillsets that will be needed for planning, managing, and operating the future transportation system, and identify existing training opportunities and gaps to address those needs. 2-E) Identify organizational areas (such as asset management or information technology) that will be impacted and need to adapt within a CAT future.	
03	Restructure agency budgets to most effectively encourage innovative culture and adaptation to changing technology.	3-A) Identify and prioritize safety related transportation expenditures and initiatives that embrace CAT technologies to reduce societal costs of crashes.	Safety, Stewardship
04	Use agency performance measures to prioritize technology investments.	4-A) Create a framework to screen technology investments based on how they contribute to agency performance measures. 4-B) Create a discretionary fund to procure technologies that meet the performance measure criteria.	Stewardship
05	Develop and maintain CAT data security, privacy, and governance policies and standards.	5-A) Identify open data needs from the private and public sector and create a plan to address the gaps. 5-B) Identify and collect CAT data from private and public sector on data.wa.gov. 5-C) Identify data stewardship principles for data collected, stored, processed, or disseminated for CAT-related initiatives, programs, or sources. 5-D) Update/develop data standards, specifications, and policies that support connected infrastructure. This includes clarifications on who owns what data, who can access it, what it is used for, etc. Policies should enable public-private data sharing that protects trade secrets and individual privacy. 5-E) Implement robust administrative, technical, and physical security protocols for all public infrastructure.	Stewardship

Strategy Number	Strategy	Action	Legislative Goals Addressed*
		5-F) Evaluate, plan, and provide guidance for the IT security needs and threat response plans for transportation and local agencies. 5-G) Dedicate IT or IT positions to cybersecurity. 5-H) Conduct a workshop with a comprehensive list of public and private subject matter experts to identify near-term steps to address existing cybersecurity gaps for CAT-related transportation systems and services. 5-I) Produce a strategy document with recommendations for the state on shared mobility data Standards, storage, and management. This document would involve a diverse group of stakeholders from the public and private sectors in evaluating existing data standards (including the Mobility Data Specifications (MDS)), researching data management best practices, and working towards forming strong data sharing partnerships.	

2. Shared Mobility

Encourage and incentivize shared mobility, including an emphasis on high occupancy and shared modes for moving people and goods.

Strategy Number	Strategy	Action	Legislative Goals Addressed*
**Transportation System Policy Goals RCW 47.04.280(1):* *1) Economic Vitality, 2) Preservation, 3) Safety, 4) Mobility, 5) Environment, 6) Stewardship*			
01	Increase the proportion of homes that are within 10 minutes (walk or shared ride) of a transit service with peak hour headway of 15 minutes or less.	1-A) Work with local transit agencies or providers and residents to identify areas where transit use is sub-optimal. 1-B) Encourage transit agencies or providers to work with private partners to increase transit access. 1-C) Explore opportunities for automated shuttles to feed transit stations. 1-D) Support partnerships with ride-hailing companies that demonstrate an increase in transit or other high occupancy mode ridership. 1-E) Pilot the remote and/or autonomous repositioning of electric scooters or e-bikes to improve connections to transit. 1-F) Identify a list of existing planning tools for assessing the connection between modal options and housing.	Economic Vitality, Mobility, Environment, Stewardship
02	Adapt and reuse public infrastructure as mobility needs evolve.	2-A) Analyze the historical and projected usage of existing Park and Ride lots and identify underutilization issues and potential barriers to other uses, such as shared mobility hubs. 2-B) Develop a plan for transitioning consistently underutilized Park and Ride lots to other uses such as shared mobility hubs. 2-C) Provide guidance to local agencies and professionals on how to evaluate the reutilization of road space to support the use of emerging modes, such as through Road Diets or Complete Streets. 2-D) Evaluate the transit grid to work toward better access and connections in the system, and to strengthen it where it is the weakest.	Economic Vitality, Preservation, Mobility, Environment, Stewardship

Strategy Number	Strategy	Action	Legislative Goals Addressed*
		2-E) Provide resources and technical assistance to local jurisdictions to implement Business Access and Transit (BAT) lanes in designated corridors.	
03	Explore methods to resource and support shared mobility initiatives. Initiatives should cover a number of use cases and communities, not only urban.	3-A) Develop a list of methods to incentivize shared mobility. The list should include: • How the method incentivizes shared mobility (e.g. use case) • Supported area(s) (e.g. city, county, region) • Potential public or private partners needed to implement and support the initiative • Implementation timeline • Estimated implementation and operations costs • Potential funding sources (e.g. Grants) to support implementation and/or operations 3-B) Identify, evaluate, and communicate the list of GIS-based tools that can conduct a macro level planning analysis using publicly accessible data (e.g. Sugar Access, Census Track and Streetlight Data) to identify opportunities to increase access to and usage of shared mobility options. 3-C) Explore opportunities to expand vanpool services, including the electrification and/or automation of vanpools. 3-D) Develop vehicle occupancy detection systems to measure efficiency of all vehicles, including freight, in managed lanes.	Mobility, Environment, Stewardship
04	Embrace mode-neutral capacity measures.	4-A) Define "shared mobility" quantitatively in terms of moving people and goods. Establish mode-neutral capacity measures that calculate capacity for all modes, including active modes and transit. 4-B) Identify under-utilized facilities that can increase person-throughput, such as with managed lanes and road diets.	Mobility, Environment, Stewardship
05	Encourage high adoption of shared mobility by enhancing the commuter experience and reducing costs from shared, automation, and electrification.	5-A) Measure commuter experience metrics to identify areas for enhancement. Metrics include, but are not limited to, time to destination and number of changeovers/hops to destination.	Economic Vitality, Mobility, Environment, Stewardship

3. Economic Vitality and Livability

Create resilient and efficient regional networks and empower local agencies to create resilient, multimodal local networks.

Strategy Number	Strategy	Action	Legislative Goals Addressed*
**Transportation System Policy Goals RCW 47.04.280(1):* *1) Economic Vitality, 2) Preservation, 3) Safety, 4) Mobility, 5) Environment, 6) Stewardship*			
01	Incorporate emerging modes in transportation planning.	1-A) Provide resources and technical assistance to cities and counties to adopt appropriate mobility data standards (such as the Mobility Data Specification) into their ordinances and/or contracts that manage private mobility providers using the public right-of-way. 1-B) Provide resources and technical assistance to RPOs and MPOs to include emerging MaaS and MOD modes into regional travel demand models. 1-C) Develop a public-private partnership to support and resource a research project that examines how the Public Records Act (PRA) may be updated to: • Protect trade secrets for private mobility providers • Protect personally identifiable information for users • Allow for data sharing between public and private entities that advances mobility, safety, equity, and other public interest outcomes; involving a diverse set of stakeholder and partners. 1-D) Evaluate and assess the experience of cities and counties that have adopted mobility data standards (such as the Mobility Data Specification) into their ordinances and/or contracts that manage private mobility providers using the public right-of-way.	Economic Vitality, Mobility, Environment, Stewardship
02	Use public/private partnerships.	2-A) Partner with telecom companies to expand the availability of high-speed internet in rural corridors. 2-B) Research ways to partner with telecom companies to install fiber and wireless communications infrastructure within public rights of way. 2-C) Support local jurisdictions to pilot MaaS and MOD strategies.	Economic Vitality, Stewardship

Strategy Number	Strategy	Action	Legislative Goals Addressed*
		2-D) Partner with MaaS providers to conduct demonstration projects that illustrate how to address specific mobility needs with MaaS. 2-E) Partner with other agencies and private companies to ensure dark fiber is included in as much of the infrastructure as possible.	
03	Increase the person-throughput on commuter routes.	3-A) Provide resources and technical assistance to local jurisdictions to implement transit signal prioritization in designated corridors. 3-B) Provide resources and technical assistance to local jurisdictions to implement managed lanes (e.g. BAT or HOT) in designated corridors.	Economic Vitality, Mobility, Stewardship, Environment
04	Provide transportation funding resources for CAT initiatives.	4-A) Assess alternatives to the state gas tax for sustainable state transportation funding. 4-B) Evaluate potential local, state, regional, and federal grant funding and resources for CAT initiatives, demonstrations, and deployments.	Economic Vitality, Stewardship
05	Encourage coordination and communication between cities and agencies for efficient regional mobility.	5-A) Explore the inter-agency relationships which may impact and influence potential mobility policies, programs, and efforts.	Economic Vitality, Mobility
06	Coordinate with freight and local services.	6-A) Identify methods for local entities to coordinate with public agencies, and private industries to identify needs for technology strategies to support the movement of goods and services.	Economic Vitality, Mobility

4. Infrastructure and Context Sensitive Street Design

Promote durable, physical and digital networks that accommodate the movement of people and goods in ways that are appropriate for the context.

Strategy Number	Strategy	Action	Legislative Goals Addressed*
**Transportation System Policy Goals RCW 47.04.280(1):* *1) Economic Vitality, 2) Preservation, 3) Safety, 4) Mobility, 5) Environment, 6) Stewardship*			
01	Promote resilient infrastructure enhancements.	1-A) Evaluate the performance of existing recessed striping in areas with frequent snowplow activity in relation to current and near-term connected vehicle and infrastructure technologies. 1-B) Evaluate and adopt standards for machine readable signing and striping. Standards may be adopted from Manual on Uniform Traffic Control Devices (MUTCD), other industry standards, or through development of standards specific to the state. 1-C) Prioritize roadway investments that leverage or support existing or near future connected or automated technologies, based on the benefit verses cost for the implementation and maintenance, taking facility lifecycle into consideration. 1-D) Partner with telecom companies to advance standards for communications infrastructure that support CAT, e.g. 5G. 1-E) Classify roadways and corridors to identify areas for improvement to support connected and automated technologies. Classification should include levels of classification (e.g. needs upgrade, meets, or exceeds needs for connectivity and automation). Use the NCHRP 20-24(112) Connected Road Classification System (CRCS) Framework to support this initiative. 1-F) Prioritize corridors and/or roadway types for implementation of CAT technologies, based on results of Connected Road Classification System initiative (*action 03-01-E*). Prioritization should take facility function and service life into consideration. 1-G) Create a plan to improve roadway pavement markings in a manner consistent with current and	Preservation, Safety, Stewardship

Strategy Number	Strategy	Action	Legislative Goals Addressed*
		developing ADAS technology performance, and in compliance with MUTCD. 1-H) Assess infrastructure elements (such as signing, striping, and potential need for roadside communication equipment) to identify areas for improvement or replacement to enable and support the operation of automated and connected technologies and solutions. Assessment should include the current state of the element (e.g. good, fair, poor) and maintenance and upgrade cycles.	
02	Preserve and utilize the 5.9 GHz wireless communication spectrum for public safety applications.	2-A) Identify vehicle to everything (V2X) data sharing uses case implementations. 2-B) Evaluate both cloud and roadside infrastructure-based V2X implementations in a technology neutral manner. 2-C) Plan for a multi-agency connected vehicle data platform to collect and share connected vehicle information from infrastructure, moving vehicles, multimodal and third parties so multiple users (OEMs, private sector, and public sector) can access and turn the data into useful information. Platform should only include data feeds appropriate for sharing with the public. 2-D) Assess how V2X technologies equitably account for the needs of all modes (e.g. Start with Signalized Intersections and then identify other use cases such as mid block crossings, bike lanes, etc.)	Safety, Mobility, Stewardship
03	Ensure existing statutes do not restrict infrastructure readiness.	3-A) Audit current laws (Revised Code of Washington (RCW) and rules (Washington Administrative Code (WAC) to identify outdated, contradictory, or restrictive policy prescriptions.	Stewardship

Strategy Number	Strategy	Action	Legislative Goals Addressed*
04	Advance curb space management practices to support emerging modes.	4-A) Participate as a panel member of the ISO standards development effort (e.g. ISO/PWI TR 4448) for use of curb space. 4-B) Work with partners, including local government, to develop clear curb management regulations that compliment connected vehicles and infrastructure.	Preservation, Mobility
05	Use resiliency as a performance measure to prioritize projects.	5-A) Define safety and operational resiliency quantitatively. Leverage data and analytical tools to identify resilience gaps and use it as a project prioritization tool. 5-B) Leverage data and analytical tools as new construction projects are being considered to determine how they mitigate safety and operational resiliency issues.	Preservation

5. Land Use

Encourage land use development patterns that support multimodal connectivity to efficient local and regional networks.

Strategy Number	Strategy	Action	Legislative Goals Addressed*
**Transportation System Policy Goals RCW 47.04.280(1):* *1) Economic Vitality, 2) Preservation, 3) Safety, 4) Mobility, 5) Environment, 6) Stewardship*			
01	Promote smart growth.	1-A) Provide resources and technical assistance to local jurisdictions to incorporate shared mobility and transit-oriented development principles into their comprehensive plans and zoning ordinances. 1-B) Provide resources and technical assistance to cities and counties that encourage innovative parking management policies, such as reducing or eliminating parking requirements, that support desired, equitable mode shift. 1-C) Conduct land use scenario modeling to identify and evaluate the impacts connectivity, automated, shared mobility, and electrification have on smart land use development.	Economic Vitality, Preservation, Mobility, Environment, Stewardship

6. Equity

Work with marginalized communities to increase access to desirable mobility options.

Strategy Number	Strategy	Action	Legislative Goals Addressed*
**Transportation System Policy Goals RCW 47.04.280(1):* *1) Economic Vitality, 2) Preservation, 3) Safety, 4) Mobility, 5) Environment, 6) Stewardship*			
01	Expand the number of marginalized communities involved in drafting CAT policies.	1-A) Create an Equity subcommittee of the Autonomous Vehicles Work Group.	Economic Vitality, Safety, Mobility
02	Serve diverse populations.	2-A) Establish performance measures for ADA accessibility for private mobility providers. 2-B) Evaluate private mobility provider solutions, including but not limited to transportation network companies (TNCs), as a method of supplementing Fixed Route Transit and either replacing or supplementing Dial-a-Ride services. 2-C) Ensure connected automated transportation works for vulnerable populations outside of urban areas. 2-D) Seek out and support solutions that enable the development of connected automated transportation solutions for human services transportation. 2-E) Define accessibility criteria for connected and automated transportation solutions (including but not limited to TNCs, micromobility, supplemental transit services, etc.). Accessibility criteria shall be developed in coordination with the Washington AV Work Group Health & Equity Subcommittees and its diverse membership to identify accessibility criteria for marginalized, disabled, disadvantaged, and underserved populations. 2-F) Establish a path forward to apply accessibility criteria to pilot and deployment projects and performance measures for publicly funded CAT initiatives.	Safety, Mobility

Strategy Number	Strategy	Action	Legislative Goals Addressed*
		2-G) Develop training and guidance for Transportation Network Companies (TNCs) to enable their services to comply with Americans with Disabilities Act (ADA).	
03	Meet the mobility needs of vulnerable populations.	3-A) Consult with marginalized communities on their mobility needs. 3-B) Prioritize and provide resources for marginalized communities' mobility needs. 3-C) Implement an AV shuttle pilot in an urban corridor that is targeted to serve vulnerable populations. 3-D) Provide resources and technical assistance to transit agencies and local governments to make desirable mobility options available to historically underserved populations. Set up measurement benchmarks to quantify the progress in providing accessibility to alternative options. 3-E) Identify and address barriers to using active modes, such as bike shop deserts or lack of basic mechanics and maintenance knowledge. 3-F Identify and address barriers to shared mobility mode use such as inadequate lighting, long headways, and other issues that make users (especially women) fear for their safety. (Example: Strategies like CCTVs are preferred by transit users.)	Safety, Mobility
04	Incorporate community health into project prioritization criteria.	4-A) Identify best practices criteria, implementation approaches and potential barriers to incorporating a health impact assessment into the SEPA process. 4-B) Identify urban and rural projects to pilot the health impact assessment. (e.g. If Federal Transit Administration Integration Mobility Innovation grant funding is secured, evaluated the SAE Level 4 AV Shuttle project in Lakewood WA with Pierce Transit).	Economic Vitality, Safety, Environment

7. Safety

Increase the safety of transportation systems and infrastructure to support the safe movement of people and goods.

Strategy Number	Strategy	Action	Legislative Goals Addressed*
**Transportation System Policy Goals RCW 47.04.280(1):* *1) Economic Vitality, 2) Preservation, 3) Safety, 4) Mobility, 5) Environment, 6) Stewardship*			
01	Explore the use of automated enforcement to supplement and/or enhance traditional enforcement methods.	1-A) Identify a list of potential use cases with supporting implementation criteria for all areas that are candidates for automated enforcement. At a minimum, evaluate speed, red-light cameras, congestion management, tolling, and occupancy enforcement. Considerations should be given to where traditional enforcement methods are unfeasible (e.g. no shoulders) or where crash rates remain high.	Safety, Mobility, Stewardship
02	Promote solutions that have the potential to reduce fatal and serious injury crashes.	2-A) Support the development of safety standards for connected and automated technologies that ensure people who drive, ride, walk, bike, and roll can safely travel in the right of way, through participation in national committees and standards development initiatives. 2-B) Evaluate knowledge competency requirements and education needs for ADAS-equipped vehicles, and the potential impact on current driver training, testing, and licensing regulations and rulemaking. 2-C) Develop a plan to implement the Cooperative Automated Transportation strategies identified in the 2019 Target Zero Plan/WA State Strategic Highway Safety Plan. For each strategy listed, Implementation Plan should include: • Lead entity/agency • Resources needed to implement • Anticipated implementation timeline	Economic Vitality, Safety, Mobility, Stewardship
03	Use gathered CAT data and Data-Driven Safety Analysis for decision-making.	3-A) Identify systematic changes to the roadway infrastructure systems and services that reduce crashes with Advanced Driver-Assistance Systems (ADAS). 3-B) Test new methods for safety analysis (i.e. video near-miss safety-analytics, using third party moving	Safety, Mobility, Stewardship

Strategy Number	Strategy	Action	Legislative Goals Addressed*
		vehicle data with hard braking/hard acceleration, etc.) to understand hot spots and corridor safety needs. 3-C) Develop data gathering and integration methods in order to measure the safety impact of ADAS and automated vehicles on reducing fatalities and serious injuries.	
04	Develop systems which can provide the most positive impact to safety within transit/mobility.	4-A) Identify and detail specific safety systems for focus. 4-B) Support the piloting and deployment of machine readable signs to initiate AV notifications, warnings, or vehicle controls (i.e. no markings, weight restrictions, surface changes, etc.).	Safety, Mobility
05	Embrace emerging and evolving transportation technologies to support a culture of safety.	5-A) Educate the public on the benefits and safety limitations of Advanced Driver-Assistance Systems (ADAS) that may affect safe driving behaviors. 5-B) Educate the public on how and where level 3, 4, and 5 AVs will be deployed, how they operate, and what to expect from AVs, through coordination with public agencies, consumer associations, insurance companies, vehicle dealers, etc.	Safety
06	Create a regulatory environment that supports the safe testing and deployment of connected, advanced, and automated vehicles and related technologies.	6-A) Audit current laws (Revised Code of Washington; RCW) and rules (Washington Administrative Code; WAC) to identify outdated, contradictory, or restrictive policy prescriptions. 6-B) Establish a uniform minimal level of safety assessment for the testing of automated vehicles SAE Levels 3, 4 and 5 that is consistent with other states and federal regulation in a manner that avoids a patchwork of regulation.	Safety, Stewardship

8. Environment

Reduce the local and cumulative environmental impacts of mobility to improve air and water quality, energy conservation and mitigate climate change.

Strategy Number	Strategy	Action	Legislative Goals Addressed*
**Transportation System Policy Goals RCW 47.04.280(1):* *1) Economic Vitality, 2) Preservation, 3) Safety, 4) Mobility, 5) Environment, 6) Stewardship*			
01	Make it easier for individuals to plan and execute multimodal trips.	1-A) Provide resources and technical assistance to cities, counties, RPOs, MPOs, and transit agencies to integrate their services (e.g. transit, parking, MaaS providers) into a mechanism, such as a smartphone app, that integrates planning, scheduling, and paying for trips of different modes.	Economic Vitality, Mobility, Environment, Stewardship
02	Explore how CAT technologies can support Washington State Governor's decarbonization goals and initiatives.	2-A) Develop a plan to identify integration points and opportunities to support decarbonization goals and initiatives. Plan should include: • List of decarbonization goals and related initiatives • How varied CAT technologies and tools can impact each goal/initiative • Lead agencies/entities to support integration of CAT technology/tool • Suggested implementation plans and timelines 2-B) Identify methods, tools, and techniques to measure VMT of internal combustion engine vehicles and electric vehicles separately. 2-C) Evaluate the potential to reduce greenhouse gas emissions by piloting fully electric AVs as a complement to transit and active transportation. 2-D) Pilot ways of measuring greenhouse gas emissions using moving vehicle data (i.e. connected vehicle) to improve accuracy of data for transportation planning & analysis projects.	Economic Vitality, Environment, Stewardship
03	Expand the use of technologies proven to reduce emissions.	3-A) Provide resources and technical assistance to local jurisdictions to implement truck signal prioritization in designated corridors. 3-B) Consider the impact to all system users through a comprehensive health impact assessment as part of	Economic Vitality, Mobility, Environment

Strategy Number	Strategy	Action	Legislative Goals Addressed*
		the SEPA process applied to transportation projects with CAT technology elements.	

Appendix 1: Washington state Transportation System Policy Goals (RCW 47.04.280(1))

(1) It is the intent of the legislature to establish policy goals for the planning, operation, performance of, and investment in, the state's transportation system. The policy goals established under this section are deemed consistent with the benchmark categories adopted by the state's blue ribbon commission on transportation on November 30, 2000. Public investments in transportation should support achievement of these policy goals:

(a) Economic vitality: To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to ensure a prosperous economy;

(b) Preservation: To maintain, preserve, and extend the life and utility of prior investments in transportation systems and services;

(c) Safety: To provide for and improve the safety and security of transportation customers and the transportation system;

(d) Mobility: To improve the predictable movement of goods and people throughout Washington state, including congestion relief and improved freight mobility;

(e) Environment: To enhance Washington's quality of life through transportation investments that promote energy conservation, enhance healthy communities, and protect the environment; and

(f) Stewardship: To continuously improve the quality, effectiveness, and efficiency of the transportation system.

(2) The powers, duties, and functions of state transportation agencies must be performed in a manner consistent with the policy goals set forth in subsection (1) of this section.

(3) These policy goals are intended to be the basis for establishing detailed and measurable objectives and related performance measures.

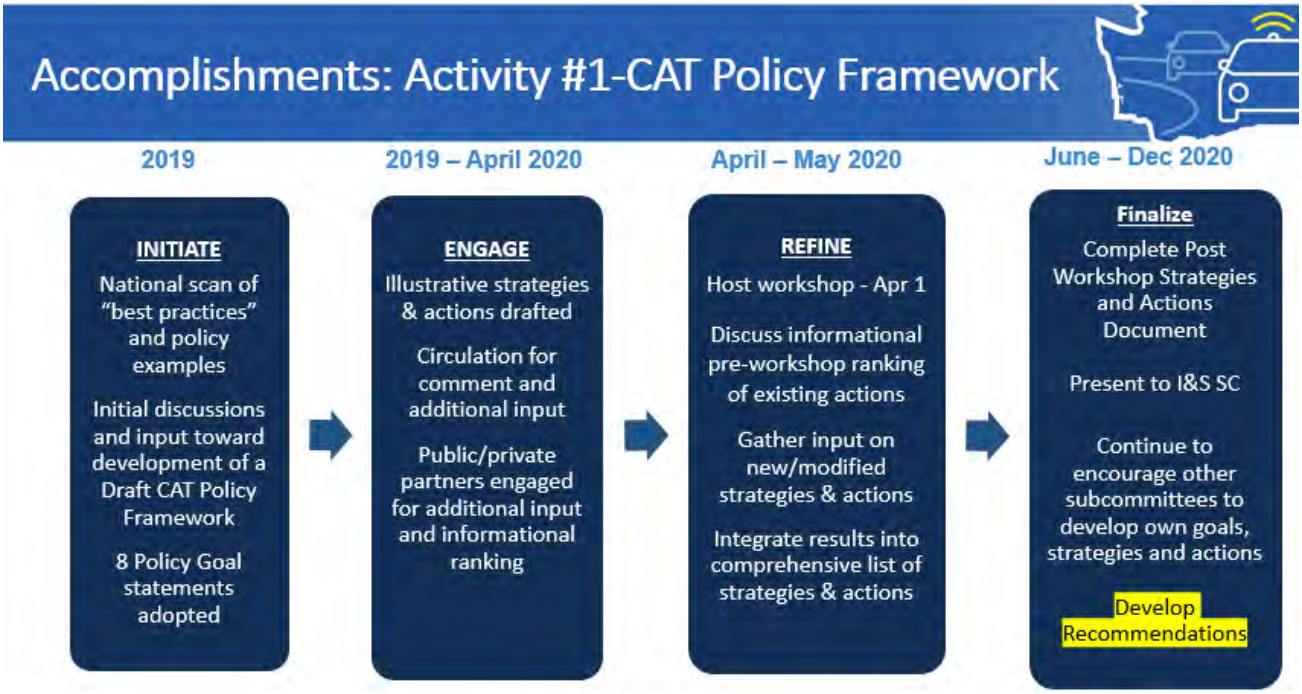
(4) It is the intent of the legislature that the office of financial management, in consultation with the transportation commission, establish objectives and performance measures for the department and other state agencies with transportation-related responsibilities to ensure transportation system performance at local, regional, and state government levels progresses toward the attainment of the policy goals set forth in subsection (1) of this section. The office of financial management shall submit objectives and performance measures to the legislature for its review and shall provide copies of the same to the commission during each regular session of the legislature during an even-numbered year thereafter.

(5) A local or regional agency engaging in transportation planning may voluntarily establish objectives and performance measures to demonstrate progress toward the attainment of the policy goals set forth in subsection (1) of this section or any other transportation policy goals established by the local or regional agency. A local or regional agency engaging in transportation planning is encouraged to provide local and regional objectives and performance measures to be included with the objectives and performance measures submitted to the legislature pursuant to subsection (4) of this section.

(6) This section does not create a private right of action.

Appendix 2: Methodology to Develop the Policy Framework

WSDOT developed a draft CAT Policy Framework[11], which was published in November 2018. The Infrastructure & Systems Subcommittee first met and discussed a 2019 Action Plan on October 2, 2018[12]. WSDOT, staff to the Infrastructure & Systems Subcommittee, prepared a Draft Action Plan that was circulated for comment among working members and discussed at the second Infrastructure & Systems Subcommittee meeting on February 8. 2019[13]. The Draft Action Plan identified *Activity 1: Develop policy goals and strategies with measureable illustrative actions based on regional and national "best practice" examples*. The Action Plan was revisited at the third meeting on April 26, 2019, resulting in a Final Action Plan.



During 2019, the subgroup of volunteers and WSDOT staff did the following:

- Reviewed local, state, regional, and federal policy frameworks and related documents to identify elements which should be incorporated into a Washington State CAT Policy Framework.
- Using the WSDOT CAT Policy Framework as a starting point, developed and refined eight policy goal statements to drive the development of subsequent strategies and illustrative actions to implement each policy goal.
- Presented the eight policy goal statements to the Infrastructure & Systems Subcommittee at the fifth meeting on August 12, 2019 to receive input from the whole Subcommittee[14].

[11] https://www.wsdot.wa.gov/sites/default/files/2019/01/22/Cooperative-Automated-Transportation-Policy-Framework-for-AASHTO-20181126.pdf
[12] Meeting Minutes https://wstc.wa.gov/Meetings/AVMinutes/Oct2/Oct2MeetingMinutes.pdf
[13] Minutes https://wstc.wa.gov/Meetings/AVAgenda/Documents/documents/20190208_AVInfrastructureSystemsSubcommitteeMtg_minutes.pdf
[14] Meeting minutes https://wstc.wa.gov/Meetings/AVAgenda/Documents/documents/20190812_AVInfrstSubCom_Minutes.pdf

- Addressed the action items and presented the eight refined policy goal statements for vote by the Infrastructure & Systems Subcommittee at the sixth meeting on September 9, 2019[15].

WSDOT incorporated the voting outcomes of the Infrastructure & Systems Subcommittee, and presented the eight refined policy goal statements to the Executive Committee on September 24, 2019. The subcommittee presented a recommendation to adopt the eight revised policy goal statements to enable the subcommittee to continue the work on the CAT policy framework and develop specific strategies. The subcommittee also recommended the development of a statewide CAT/AV policy framework which would integrate these policy goals along with policy goals developed by other subcommittees. The motion to adopt both recommendations carried.[16] The Infrastructure & Systems Subcommittee presented the eight adopted policy goal statements to the WSTC on October 16, 2019 and made the following recommendation to the WSTC:

- Adopt the eight policy goals to enable the Infrastructure & Systems Subcommittee to continue the work on the CAT policy framework and, as a next step, develop specific strategies.
- Adopt the policy goals and encourage the development of a state CAT/AV policy framework that would integrate these policy goals along with policy goals developed by other subcommittees.

  - ***Organize for Innovation***: Enable organizational change that empowers officials to be flexible, accelerate decision-making, and adapt to changing technology.
  - ***Shared Mobility***: Encourage and incentivize shared mobility, including an emphasis on high occupancy and shared modes for moving people and goods.
  - ***Economic Vitality and Livability***: Create resilient and efficient regional networks and empower local agencies to create resilient, multimodal local networks.
  - ***Infrastructure and Context Sensitive Street Design***: Promote durable, physical and digital networks that accommodate the movement of people and goods in ways that are appropriate for the context.
  - ***Land Use***: Encourage land use development patterns that support multimodal connectivity to efficient local and regional networks.
  - ***Equity***: Work with marginalized communities to increase access to desirable mobility options.
  - ***Safety***: Increase the safety of transportation systems and infrastructure to support the safe movement of people and goods.
  - ***Environment***: Reduce the local and cumulative environmental impacts of mobility to improve air and water quality, energy conservation and mitigate climate change.

The WSTC reviewed and voted to endorse the recommendation. Discussion included:

- Request for information on the subcommittee members that voted against the policy goal statements: What organizations, what were the objections, and have their positions changed.
  - The City of Bellevue and the Discovery Institute indicated general support for the direction of the policy goals but requested refinement of specific goal statement wording to better meet the goal's intent.
  - The Washington Policy Center did not support many of the policy goals and shared concerns about the process used by the subcommittee to develop the policy goal statements. Major revisions were requested of almost all policy goal statements.

[15] Meeting minutes https://wstc.wa.gov/Meetings/AVAgenda/Documents/documents/20190909_InfSys_minutes.pdf
[16] Meeting summary https://wstc.wa.gov/Meetings/AVAgenda/Documents/20190926_ExecComm_MeetingSummary.pdf

    - The Infrastructure & Systems subcommittee revised the policy goal statements based on this feedback and to address the direction of the majority of voting respondents. These revisions were made prior to the formal recommendation presented to the Executive Committee on September 26th.
- Clarification on Policy Goal Statement #1 "Organizing for Innovation" – How individual entities and the State can organize, structure, operate and collaborate to better prepare for AVs and evolving policy.

The Infrastructure & Systems Subcommittee further recommended that it develop statewide CAT/AV Policy Framework that would integrate the WSDOT CAT policy goals along with policy goals developed by other subcommittees. The WSTC endorsed this recommendation.

Strategies and Illustrative Action Development

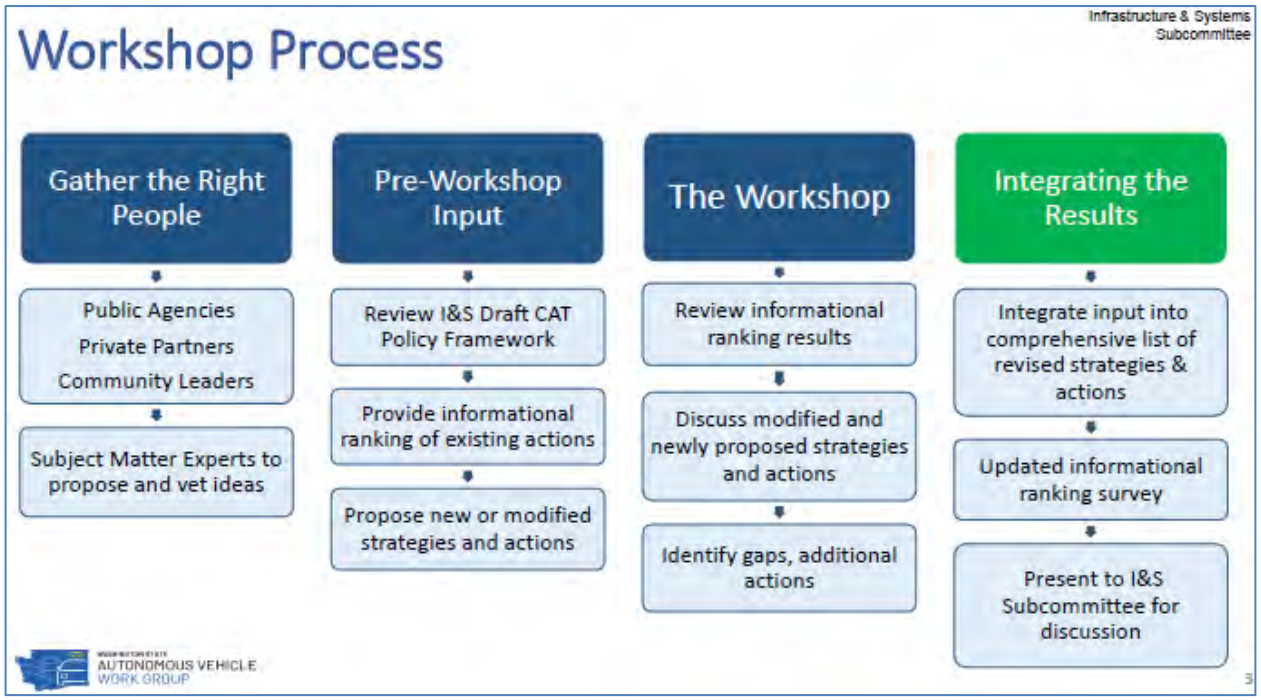
Development of these policy goals was the first in a multi-step approach, which included developing strategies and illustrative actions based on local, regional and national "best practice" policy examples.

Following the September 2019 Executive Committee adoption of 8 policy goal statements, the subcommittee's Activity 1 Work Group drafted an initial set of interim strategies and illustrative actions and presented these at the December 2019 subcommittee meeting. The drafted strategies and actions were used as a starting point to support for the statewide CAT Policy Framework Development Workshop, held on April 1, 2020.

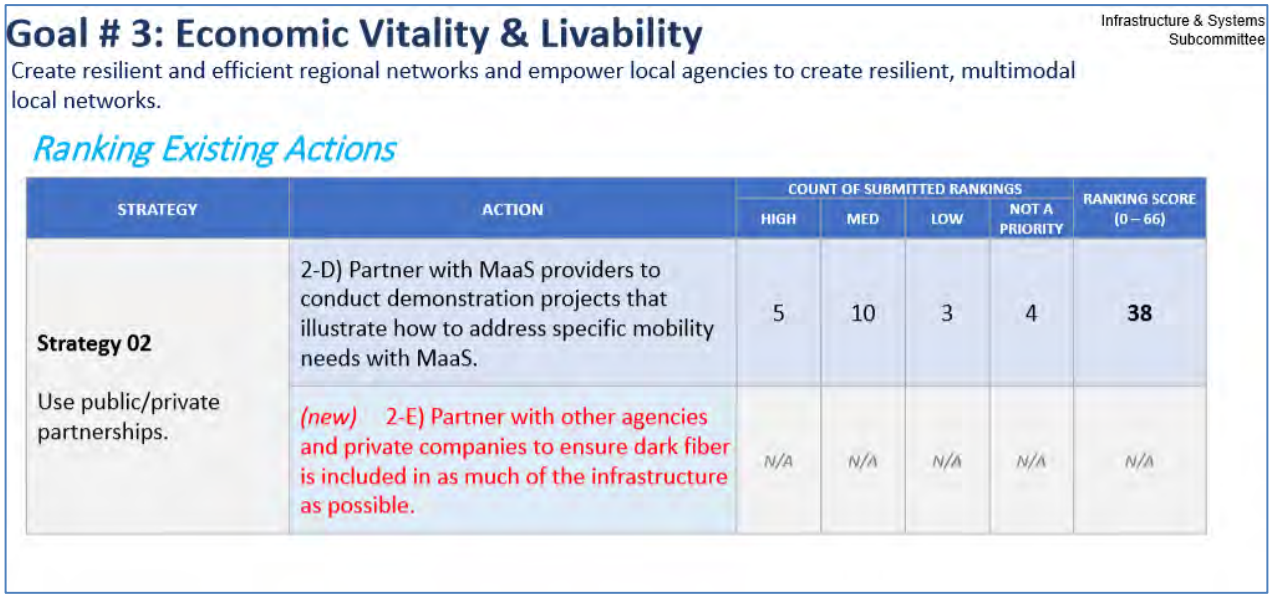
The goal of the workshop was to engage as many stakeholders as possible in identifying a set of strategies and actions:

- The subcommittee reached out to broad group of interested public and private partners, agencies, and advocacy groups. Getting the right people to the table, to get the right input was an emphasis.
- It was important to have a neutral party facilitate the workshop and analyze the results. In addition, subject matter expertise was needed when analyzing actions and strategies, WSDOT staff and the subcommittee contracted with a consulting firm, WSP, to provide neutrality and subject matter expertise.
- Much work was done by participants, completing pre-workshop assignments, reading materials, completing surveys. Ultimately, this work was critical for the success of the virtual workshop. The pre-work included:
    - Review of the draft CAT Policy Framework
    - Informational rankings of existing draft strategies and illustrative actions
    - Proposals of new or modified strategies and actions

Workshop Process



Example of how information was presented during workshop



Workshop Results

Six Hour Workshop Participation by the Numbers:

- Participants provided over 150 pieces of new feedback
- 35 workshop participants (in addition to staff)- almost equal number of public and private sector representatives
- All seven AV WG subcommittees were represented
- In total, 37 strategies were reviewed, 15 were new, suggested during pre-work
- In total, 101 actions were reviewed, of those, 52 actions were new, suggested during pre-work

Post-Workshop Activities and Products Include:

- Staff and consulting team synthesized the significant level of input received during the workshop, integrating it into a comprehensive list of strategies and actions.
- Existing language that may have been vague was strengthened
- Vague language was clarified to be more measurable
- The Activity 1 Work Group received a first draft of updated list to review for red flags, fatal flaws and areas that need further clarification
- Presented the workshop update on process and initial results to subcommittee members at the April 22nd, 2020 subcommittee meeting
- All workshop comments and input was tracked and reviewed and documented in a "Strategy and Action Feedback Log"
- The 150 pieces of input were incorporated into the " Revised draft Policy Framework Strategies and Actions" inventory document and shared broadly throughout the summer of 2020.
- Updated and finalized the December 2019 WA AV CAT Policy Framework Working Document to include all strategies and illustrative actions developed and the work completed in 2020.
- Presented this final CAT Policy Framework document at the December 11, 2020 subcommittee meeting.