



# Appendix B

## **Preliminary List of Action Ideas**

At a stakeholder Mobility Choice workshop held on May 22, 2018, the participants identified 119 ideas for actions related to mobility technology to be considered for the Blueprint. Note that the preliminary ideas were categorized by a set of topics that were also developed at the workshop. In the ensuing months, these actionable ideas were screened, developed, and refined to become the 34 Recommended Tactical Actions presented in Chapter 4 of the Blueprint. The complete list is documented here to record the ideas to be available for future consideration.

## Preliminary List of Action Ideas (May 22, 2018)

### 1. Safety

#### 1.1 Prioritize transportation infrastructure connectivity

- 1.1.1 Provide Traffic Management Center connectivity (communications backhaul) from all traffic signals, ITS equipment, cameras, or other digital infrastructure assets within the Denver region
- 1.1.2 Implement smart street lights on principal arterial corridors
- 1.1.3 Implement adaptive traffic control on principal arterials

#### 1.2 Prepare for connected automated vehicles

- 1.2.1 Require AV/CV capacity, safety, and environmental impacts review as part of roadway, transit, or bridge design Project Development (e.g., as part of Planning and Environmental Linkages)
- 1.2.2 Require retrofitting/fitting of lane marking, roadside reference markers, and adjustments to lane geometry for autonomous vehicles as part of reconstruction/new construction projects
- 1.2.3 Develop a pilot project for examining infrastructure components to enhance the safety and operation of autonomous vehicles throughout the Denver region
- 1.2.4 Develop a public education / driver education and operator testing plan for technology as part of license renewal/first time licensee
- 1.2.5 Conduct a safety assessment to examine AV/CV applications with the highest potential ability to improve safety within the Denver region (all modes)
- 1.2.6 Conduct an AV/CV Readiness Assessment across all modes in the Denver region
- 1.2.7 Develop guidelines and policies to define Operational Design Domain parameters for the safe operation of an autonomous vehicles within the Denver region
- 1.2.8 Provide monetary incentives to consumers for Vehicle-to-Vehicle Connectivity (V2V)

#### 1.3 Enhance personal safety and security

- 1.3.1 Develop an infrastructure data governance plan for the intentional or inadvertent capture and processing of Personally Identifiable Information (PII)
- 1.3.2 Develop a policy to protect the safety of riders in ridesourcing, ridesharing, autonomous transit, and carpooling

#### 1.4 Improve safety of vulnerable road users

- 1.4.1 Conduct a pilot study(ies) with consumers and fleet owners to incentivize the installation of on-board equipment that limits vehicle speeds or provides over-speed alerts as part of a

## Preliminary List of Action Ideas (May 22, 2018)

managed arterial digital speed control program
1.4.2 Develop a public-private partnership with insurance companies to expand safety incentives (e.g., provide insurance subsidies/discounts) from telematics devices
1.4.3 Implement a demonstration project to test the concept of employing a complete street concept with shared mobility lanes (microtransit, bicycle, alternative personal transportation devices) vehicle lanes, and greenspace as a mechanism for improving safety
<b>1.5 Align multi-modal operation policies</b>
1.5.1 Prioritize technology pilots for the top 5% corridors ("5%" corridors) that are identified with safety concerns
1.5.2 Prioritize "5%" corridors as part of the project programming process
1.5.3 Conduct an assessment across the Denver region to determine locations and conditions where automated parcel delivery would pose a potential safety hazard
1.5.4 Develop a policy for the use of drone package delivery within the Denver region
<b>2. Sustainable Mobility</b>
<b>2.1 Responsible deployment and access to connected automated shared electric (CASE)</b>
2.1.1 Create a joint policy regarding the use of autonomous vehicles within the Denver region by governmental fleets
2.1.2 Conduct a study to determine locations within the region that are currently not suitable for autonomous vehicles (i.e., an AV Readiness Assessment) and correct deficiencies
2.1.3 Change HOV/HOT lane policy to allow for AVs as part of a MaaS fleets to operate in HOT/HOV lanes regardless of occupancy
2.1.4 Change HOV/HOT Lane policy to permit access to these lanes for electric vehicles regardless of occupancy
2.1.5 Create dedicated AV lanes in key corridors
2.1.6 Develop and implement policies that will promote or require the use of electric vehicle technology within autonomous vehicles
2.1.7 Develop and implement a region-wide integrated trip planning application to include all transportation operators, including public, quasi-public, and private
2.1.8 Conduct a technology pilot project regarding improving efficiencies on roadways connecting mountain communities with each other and the greater Denver region
<b>2.2 Position public transit as the backbone of a high capacity system</b>
2.2.1 Invest heavily in high capacity mass-transit modes within the Denver region
2.2.2 Create a public-private partnership to establish transit service in areas underserved by traditional high capacity modes
2.2.3 Conduct a pilot trial of alternative transit for first mile/last mile connectivity
2.2.4 Prioritize transit spending to commuter routes by adding service to improve frequency, trip

## Preliminary List of Action Ideas (May 22, 2018)

reliability, and comfort for commuters
2.2.5 Implement a "free transit" program for commuters
2.2.6 Conduct a pilot project to assess the elasticity of demand and utilization of transit as a function of price for commuters
2.2.7 Establish network of smart mobility hubs of different scales across the Denver region to connect multiple modes of transportation such as transit, bikes, car sharing, etc.
<b>2.3 Prioritize a diverse array of mobility options throughout the Denver region</b>
2.3.1 Develop a policy for project prioritization that utilizes the metric of people movement through the region rather than vehicle movements as a performance measure
2.3.2 Change the STIP/TIP project prioritization schema to increase the potential for walking and biking projects to be ranked higher - and ultimately selected for funding
2.3.3 Develop new specifications for traffic signalization that requires detection of pedestrians and cyclists on the Region's principal arteries as part of new equipment installation
2.3.4 Conduct a pilot demonstration for pedestrian and bicyclist detection in a principal artery
2.3.5 Require retrofitting existing traffic signals with pedestrian and bicyclist detection systems for the principal arterial corridors
2.3.6 Create a public-private partnership outreach program for healthcare industry partners to promote the use of active transportation travel modes
2.3.7 Create a program to expand bike share use, and to coordinate efforts with other trip planning and mobility hub efforts
2.3.8 Create "pedestrian only" phasing at urban intersections where there is a high-concentration of pedestrians
2.3.9 Create standards that would require new developments to include infrastructure for walking and biking
<b>2.4 Manage freight and air space in a sustainable matter</b>
2.4.1 Create regulatory and policies to disincentivize on-street stopping for package and freight deliveries
2.4.2 Conduct a pilot project to investigate alternative approaches for off-street interim parking solutions for freight package delivery
2.4.3 Implement curbside parking management strategies for freight deliveries and passenger drop-off/ pickup
2.4.4 Develop a curbside access policy that includes enforcement, restrictions, and zoning of the curb based upon the predominant land-use of the parcel
2.4.5 Perform a study on the potential implications and potential policy interventions for managing short range and low altitude aerial vehicles for both freight and traveler transportation within the Denver region

## Preliminary List of Action Ideas (May 22, 2018)

### 3. Funding & Finance

#### 3.1 Adjust funding priorities to align with the Mobility Choice Blueprint

- 3.1.1 Develop a procurement policy to consistently evaluate private partnerships for new projects and pilots
- 3.1.2 Conduct a study to examine current infrastructure assets to identify the costs associated with retrofitting them to support emerging technologies such as Connected Vehicles, Autonomous Vehicles, and Sensor Data Collection
- 3.1.3 Develop a Public-Private Partnership plan to incentivize the private sector to provide enabling communication and electrification infrastructure (smart utilities)

#### 3.2 Establish funding resiliency and flexibility into funding capture programs

- 3.2.1 Implement a regional registration fee program for electric vehicles
- 3.2.2 Establish user fees or revenue streams for data products derived from AV/CVs
- 3.2.3 Implement a regional congestion pricing program in conjunction with tolling to incentivize transit
- 3.2.4 Expand HOV/HOT tolling program to include other facilities
- 3.2.5 Impose additional fees on MaaS providers to incentivize transit based upon pickup/drop-off locations
- 3.2.6 Develop alternative funding streams to the gasoline tax

#### 3.3 Price activities to achieve mobility objectives appropriately considering efficiency, fairness, and equity

- 3.3.1 Conduct a regional pilot project on road user charging with charges based upon occupancy, congestion, mileage
- 3.3.2 Conduct a pilot study to examine technologies for dynamic curb space pricing
- 3.3.3 Develop a regional land use policy designed to promote the use of transit oriented development within the region
- 3.3.4 Develop a regional land use policy designed to promote commercial development along existing transit corridors
- 3.3.5 Conduct a pilot study to explore technology options to disincentivize the use of SOV AVs from outside the urban growth boundary into the CBD through pricing and other means

### 4. Human Experience

#### 4.1 Create and prioritize a human-centered approach to mobility services

- 4.1.1 Codify a "Mobility Bill of Rights"
- 4.1.2 Develop a strategy and business plan for a travel concierge service to keep the human interface for micro transit AV

#### 4.2 Create a scalable, affordable, accessible public transit network

- 4.2.1 Conduct an analysis to determine the appropriate sized vehicle per route and then create a

## Preliminary List of Action Ideas (May 22, 2018)

policy for rightsizing vehicle/service based on future needs
4.2.2 Implement a dynamically sized vehicle plan for transit
4.2.3 Establish a publically subsidized dynamic transit service model
4.2.4 Conduct an assessment study to determine neighborhoods that do not currently have access to public transit
4.2.5 Initiate new public transit service to any neighborhoods determined not to have access to public transit options
4.2.6 Require new commercial or residential development projects to provide access to public transit
4.2.7 Provide a program to purchase daily transit passes at monthly-pass discounted costs for qualified riders
<b>4.3 Create a frictionless mobility system</b>
4.3.1 Develop and integrate a region-wide integrated trip planning application to include all transportation operators, including public, quasi-public, and private
4.3.2 Pilot test the use of a trip "connection protection" system to facilitate bus-to-bus, bus-to-rail, and rail-to-bus connections
4.3.3 Promote the creation of integrated trip planning of multiple modes
4.3.4 Develop a policy requiring data sharing and providing service options from private providers
<b>4.4 Create connected, diverse, resilient communities</b>
4.4.1 Develop guidelines on the use of advanced technology across the agencies as they apply to inclusionary zoning; universal design; amending zoning code travel demand management ordinance developer incentive; transit oriented development
<b>5. Infrastructure</b>
<b>5.1 Deploy instrumented and connected infrastructure (Smart City Technology)</b>
5.1.1 Choose a V2I Wireless communications standard to be used throughout the Denver region
5.1.2 Choose a wired communication standard for connecting infrastructure assets to traffic management centers throughout the Denver region
5.1.3 Prioritize the installation of hardwired, high bandwidth communications infrastructure to support roadside activities and wireless connectivity
5.1.4 Prioritize the installation of smart street lights along priority corridors within the region
5.1.5 Prioritize the installation of smart traffic signals within key intersections along priority corridors within the region.
5.1.6 Prioritize the installation and use of environmental sensors along priority corridors within the region
<b>5.2 Electrify the public way</b>
5.2.1 Incentivize the purchase and use of electric vehicles (EV) through discounted registration

## Preliminary List of Action Ideas (May 22, 2018)

fees or purchase incentives
5.2.2 Incentivize the use of EVs through the use of exclusive EV parking
5.2.3 Install publically owned electric vehicle charging stations throughout the Denver region in public areas
5.2.4 Incentivize installation and operation of charging stations for private development
5.2.5 Conduct a pilot study to examine the potential for using EVs in the Denver region to enable two-way grid
5.2.6 Conduct a pilot demonstration to outfit priority traffic signals with equipment that would enable them to be powered from an EV
5.2.7 Provide tax incentives or other discounts to power companies to encourage non-fossil fuel generated electricity
<b>5.3 Future-proof public infrastructure investments</b>
5.3.1 Require that future infrastructure projects included access to dedicated power throughout the project area
5.3.2 Require that future infrastructure project include fiber communications connectivity to traffic management centers
5.3.3 Require new infrastructure installations of digital or electronic equipment along the roadside in the Denver region be capable of supporting future technology by including appropriate space within NEMA enclosure, electronic Ethernet switches and power over Ethernet ports, fiber switches, etc.
<b>5.4 Re-imagine the public right-of-way to accommodate multiple, emerging modes of transportation</b>
5.4.1 Conduct a pilot project to investigate the feasibility and technology for implementing modular lanes (i.e., variable width lanes) and modular curbside access management
5.4.2 Conduct a pilot project to examine the utilization of alternative machine readable road signs
5.4.3 Conduct a pilot project or study to examine the potential for implementing shared mobility lanes (slow autonomous transit, bicyclist, scooters, etc.) in locations with heavy utilization of alternative modes
<b>6. Governance</b>
<b>6.1 Align local and regional agency efforts</b>
6.1.1 Prioritize "5%" corridors identified in the Metro Vision within the TIP/STIP Planning process
6.1.2 Coordinate pilot projects conducted throughout the region to avoid duplication of efforts and share findings
6.1.3 Create an empowered Regional Chief Innovation Officer who can make policy, funding, and priority decisions across regional agencies
6.1.4 Establish a pooled funding mechanism across the agencies for technology pilots
6.1.5 Require cross-agency collaboration and coordination regarding technology deployments

## Preliminary List of Action Ideas (May 22, 2018)

6.1.6	Establish a multi-agency board for coordination of regional technology projects
6.1.7	Commit to agency staff resource sharing for technology related projects
<b>6.2 Create a technology-friendly environment that promotes economic development</b>	
6.2.1	Create a consistent multi-agency technology innovation policy that outlines single points of contact and provides a clear pathway for private partner engagement
6.2.2	Actively seek to host technology centric conferences and symposiums within the Denver region such as ITS America/World Congress, etc.
6.2.3	Create tax incentives to promote private deployment or public/private partnerships for technology deployment
6.2.4	Develop and implement an economic development plan designed to attract and retain technology companies to the Denver region
6.2.5	Enact regulatory and policy changes to enable new technologies to be adopted within parking and curbside rights-of way
6.2.6	Enact legislation to encourage the deployment of AV/CV and EV technologies by removing codified barriers to adoption
6.2.7	Create a Denver region innovation test center or innovation laboratory
<b>7. Data</b>	
<b>7.1 Coordinate data to optimize transportation systems</b>	
7.1.1	Establish regional data hubs for infrastructure asset data
7.1.2	Establish regional data hubs for integrated payment / data
7.1.3	Develop regional standards for data interoperability and security
7.1.4	Consolidate multi-agency data into a single data repository with joint access
<b>7.2 Develop and manage best practices for data and technology</b>	
7.2.1	Create and implement a policy that will ensure the interoperability of infrastructure and software throughout the region
7.2.2	Coordinate with regional stakeholders regarding data and technology to verify the region is in-line with the activities and standards being conducted by national and international groups
<b>7.3 Require data inter-operability</b>	
7.3.1	Establish policy standards for data sharing between regional stakeholders
7.3.2	Develop open, machine-readable data publication from instrumented infrastructure
7.3.3	Promote the development of open, well-documented API's by making these a requirement to receive STIP/TIP funding