

New Mobility Roadmap

A guide for the
future of mobility
in Alameda County

2020



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Executive Summary

Overview

The New Mobility Roadmap (the Roadmap) has been developed with a clear acknowledgment of the rapid and continuing change throughout the transportation industry and an understanding that this evolution impacts mobility for everyone, both positively and negatively. The purpose of the Roadmap is to provide Alameda County Transportation Commission (Alameda CTC) and local jurisdictions with a flexible strategy to efficiently and effectively adapt to this change, harness opportunities, and mitigate risks.

The Roadmap has been designed as a flexible document, which allows Alameda CTC to react to change. It was developed through a multi-stop process. First, nine goals, which articulate desirable outcomes, were established as a foundation for the plan. Second, a set of strategies were developed to react to specific agents driving

technological change. From this, a universe of potential actions were defined and then organized into Initiatives where synergies and dependencies exist between actions. Finally, a list of Near-Term Priority Actions were identified to provide a starting point.

The Roadmap was developed with input from the Technology Working Group (TWG), the Alameda County Technical Advisory Committee (ACTAC), the Planning, Policy and Legislation Committee (PPLC), and the Alameda County Transportation Commission.

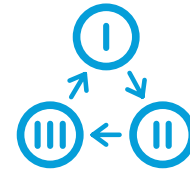
Key outcomes of the Roadmap:

- ➔ **Seven Initiatives** define how Alameda County will coordinate efforts and respond to technological change.
- ✓ **Near-Term Priority Actions** which provide a starting point to affect positive change now.

✓ Near-Term Priority Actions

- ▶ Pilot an innovative major transit corridor
- ▶ Develop a Countywide ITS strategy
- ▶ Explore and gather equity-related best practices and efforts related to new mobility technologies and services
- ▶ Pilot a Mobility Hub
- ▶ Develop a countywide transportation electrification strategy
- ▶ Establish a formal Technology Working Group (TWG)

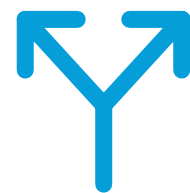
➔ Initiatives



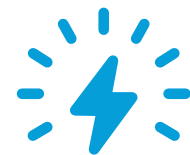
Transit Integration Initiative aims to identify and improve a network of major transit corridors to support transit as it evolves. These corridors could include: signals that prioritize public transit vehicles; multimodal hubs that have first mile/last mile connections; and ITS infrastructure equipped to enable new and emerging modes of transit, e.g. connected and/or automated vehicles. For travelers, this will result in more reliable, frequent, and faster service, with more options for first mile/last mile connectivity to their destination.



Coordinated Information Technology Services (ITS) Initiative aims to modernize ITS for Alameda County through promoting compatibility for the physical ITS infrastructure, applications, and communications across jurisdictions and transit agencies. Advanced ITS on Alameda County roads is essential to deploy and support new mobility technologies and services and maximize the capacity and use of the existing transportation system.



Transportation Demand Management (TDM) Initiative aims to support a holistic Countywide TDM Program integrating Alameda CTC's TDM efforts with local and regional TDM programs to focus on both traditional tactics for managing travel demand and Active Transportation Demand Management (ATDM) strategies that leverage data and incentives, supported by digital platform(s), to shift traveler behavior.



Electric Mobility Initiative is intended to establish a coordinated approach to promoting electrified mobility for a range of modes. The Initiative will work to encourage electric vehicle charging stations in strategic locations to improve user access, facilitate electrification of fleet vehicles, and test and promote manufacturer-agnostic charging technologies.



Equity and Accessibility Initiative aims to support new mobility as a tool to promote equitable outcomes for Alameda County communities. The approach will identify mobility needs and gaps in disadvantaged communities and where new mobility technologies could meet those needs/fill those gaps, identify challenges that result in people being left without mobility access and how to avoid those moving forward, and explore how to prevent new mobility from exacerbating existing inequalities.



Mobility Coordination and Innovation Initiative is intended to produce a framework to explore and facilitate the sharing of knowledge and guidance to effectively address new mobility, especially in areas where a coordinated approach is critical. It will also seek to support innovative approaches to mobility by local jurisdictions and transit agencies.



The Data and Automation Initiative identifies ways for agencies in Alameda County to address the emerging trend towards vehicle automation within the county's transportation system, and the proliferation of data made available by new mobility technologies and services.

Introduction

Purpose

The mobility landscape has been transformed by new technologies and services and the pace of that change continues to accelerate. The Roadmap supports the Alameda CTC and local jurisdictions as they adapt to these changes and capitalize on opportunities and strategically manage risk across Alameda County.

The Roadmap is the technology element of the 2020 Countywide Transportation Plan (CTP), and was initiated by Alameda CTC in 2019 to proactively plan for technology in Alameda County. The Roadmap has been developed with a clear acknowledgement of the rapid and continuing change throughout the transportation industry and an understanding that it needs to be revisited and updated periodically.

The Roadmap is intentionally flexible and designed to allow Alameda County to react quickly, efficiently, and strategically, to expected and unexpected changes within the transportation landscape and an ever-changing world.

The Initiatives and actions within this Roadmap provide opportunities for strategic action.

The Roadmap is also a tool for Alameda CTC and serves as coordinating element for member jurisdictions and transit agencies throughout Alameda County. Partnerships, cooperation, and coordination are a critical aspect to any effort moving forward to create a holistic transportation ecosystem that functions across Alameda County, even as it is disrupted by technological change, to connect people through a variety of mobility options. The Roadmap provides a structure for continued cooperation, and identifies key areas where efforts should be directed, building upon efforts already underway in the county and throughout the Bay Area.



New mobility located around a key transit stop in Alameda County

Key outcomes of the Roadmap

- Initiatives, a plan of action to manage uncertainty
- Near-Term Priority Actions, critical starting points
- A continuing resource for on-going technology planning and implementation for all partners

How to use the Roadmap

- Strategic plan to harness opportunities and manage risks
- Direction to identify and form partnerships
- Guidance and coordination on technology-related issues for Alameda County

Key Terms

New words and terms are emerging to describe the new concepts, services, technologies, and modes that are being developed and deployed. Although words and terms will continue to evolve as new innovations occur, the definitions and intent of the terms used within this document are described below:

Adaptive Traffic Signals - Continuously monitors arterial traffic conditions and the queuing at intersections, and dynamically adjusts the signal timing to optimize one or more operational objectives, such as minimize overall delays.

Equity - The distribution of resources based on the needs of the recipients.

Equality - The distribution of resources equally among recipients.

Intelligent Transportation Systems (ITS) - The application of sensing, analysis, control and communications technologies to ground transportation in order to improve safety, mobility and efficiency.

Micromobility - Micromobility refers to personal shared transportation devices like bicycles, mopeds, and e-scooters that are paid for through an app.

Mobility as a Service (MaaS) - A shift away from personally owned modes of transportation and towards mobility solutions that are consumed as a service.

Shared Mobility - Transportation services and resources that are shared among users, either concurrently or one after another.[1] Shared mobility technologies cover bikes to scooters and car sharing to transportation network companies.

Technology Working Group (TWG) - The coordination group with representation from jurisdictions, transit agencies, and Alameda CTC staff that tasked with addressing planning and technology-related issues.

Transit Signal Prioritization - Adjusts traffic signal green and red times when possible as buses approach to improve bus travel time and reliability.

Transportation Network Companies (TNCs) - TNCs operate ridehailing services. Companies that offer this service include Uber and Lyft.

Transit Mobile Ticketing/Payment - An app that allows transit riders to pay for fares online and use their phones to present proof of fare upon boarding. Could evolve to include all forms of fare-based transport in a unified payment platform.

Transportation Demand Management (TDM) - A set of strategies aimed at providing travelers with effective choices to improve travel reliability.

Travel Information and Payment - Trip planning and payment applications that allow private and public transit operators to integrate their services in ways that reduce the need for a traveler to utilize multiple stand-alone transit applications.

What is new mobility?

A service, mode, transportation infrastructure, or a combination of these that leverages new digital communication platforms and data to connect travelers to mobility options to move, share and use the transportation infrastructure.

Roadmap Hierarchy

The Roadmap was developed through a multi-step process, beginning with policy-level goals and culminating with discrete actions. The nine goals are the most foundational element of the Roadmap which articulate a set of desirable outcomes. A set of strategies were then developed to react to specific drivers of technological change. From this, a universe of potential actions were defined and then organized into Initiatives where synergies and dependencies exist between actions. Each element of the Roadmap is further defined below:

Goal

Desired outcomes for new mobility technologies and services defined in broad terms.

Goals are foundational to this effort, and express the values and broad public benefits and outcomes that the Roadmap is working towards. These are based on the CTP goals and refined for the context of new mobility.

Technology Drivers

Range of evolving technologies and services that act as agents of change in Alameda County.

These categories represent the key technologies and trends that are driving innovation and disruption in transportation. Their growth is affecting how travelers access mobility, how mobility affects the transportation system, and how new modes are continuously evolving.

Strategies

Approaches to achieve each goal.

The creation of strategies were an iterative step in translating the goals into actions. They are not a key part of the roadmap, but can provide guidance on the general approach to achieving the nine goals.

Actions

Specific steps to support each of the strategies.

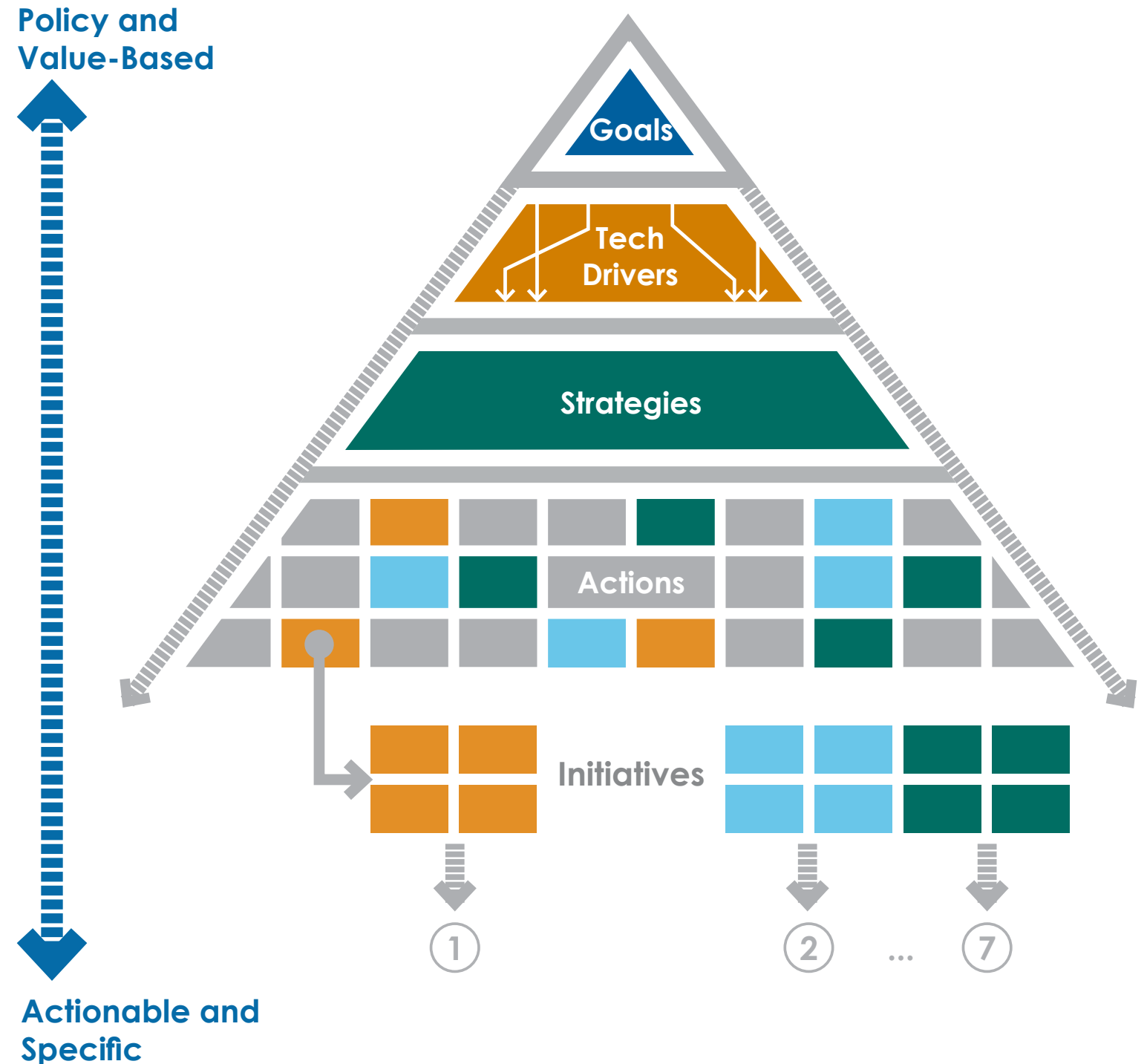
Developed as projects, programs, policies, or organizational actions, these are finite actions that Alameda CTC, member jurisdictions and transit agencies can take to support the goals and desired outcomes identified. These actions will provide a specific and strategic path forward to harness the positives and mitigate the negatives of new mobility technology. The approach created a "universe of actions" that are not all meant to be completed before the Roadmap is revisited, but instead allows for a broad array of tools which can be used to adapt to unforeseen changes in the industry.

Initiatives

Groups of related actions that define the New Mobility Roadmap intended to inform Alameda CTC and partner agency efforts in coming years.

The seven Initiatives were created to group actions into a cohesive and coordinated approach that are intended to direct activities and highlight the particular areas of focus needed to advance the Roadmap.

Roadmap Hierarchy Pyramid



Goals

Overview

Alameda CTC, with input from the Transportation Working Group (TWG) and based on various planning efforts including the Countywide Transportation Plan, identified nine goals for new mobility services and technologies in the spring of 2019.

In simple terms, these goals point towards a number of desired outcomes (ex. Convenient travel options, support for active transportation, service complementary of public transit, etc.) in the context of new mobility services and technologies. The nine goal statements represent the heart of the Roadmap and provide a description of the outcomes that new mobility should be used to achieve. The nine goals are:

1 Multimodal and High Occupancy
New mobility services and technologies must complement public transit and support active transportation and provide convenient travel options while taking into account the urban, suburban, and rural parts of Alameda County. They must also consider effects on traffic congestion, mode choice, and transit reliability.

2 Environment
Support system and environmental sustainability, promote convenient non-auto modes, and reduce vehicle miles traveled.

3 Safety
New mobility services and technologies must improve traveler safety and reduce conflicts between modes.

4 Equity and Accessibility
New mobility services and technologies will be used to advance equitable outcomes through Alameda County's diverse populations, be easily accessible and affordable for all travelers, and distributed equitably as appropriate throughout the County.

5 Connectivity
Improve connections across jurisdictions, promote efficient goods movement, offer seamless connectivity through improved modal transfers, and better connect and integrate land use, housing, jobs and transportation. They must be consistent with a common county-wide approach, and support shared regional communication infrastructure.

6 Service Quality
New mobility services and technologies must support and complement convenient and reliable public transit options and offer high quality travel options to promote a high quality of life for community members.

7 Economy
New mobility services and technologies must support vibrant communities and engage in fair labor practices.

8 Cost Efficiency
New mobility services and technologies must promote a positive fiscal impact on infrastructure investments and delivery of publicly-provided transportation services.

9 Data Sharing and Security
New mobility providers, cities, transit and other agencies, and Alameda CTC must engage and collaborate with each other and the community to share all relevant data to improve the transportation system and agency efficiency. They should also protect traveling public and infrastructure from cyber security threats.

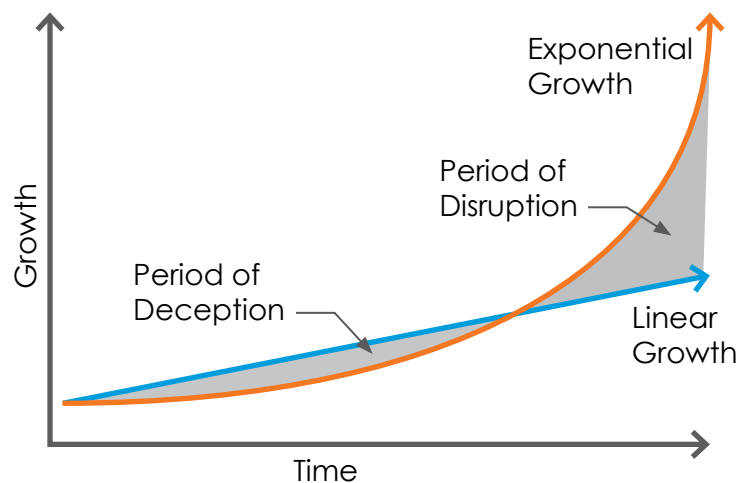
Technology Drivers

Overview

Any plan requires a clear understanding of the agents of change and inventory of the landscape it hopes to affect. This is especially true for a response to exponential growth.

Exponential growth may be deceptive initially, appearing to be incremental change until the “knee” of its growth curve at which point the abrupt acceleration of change can upend established strategies to manage the transportation network.

New Mobility technologies and services are growing exponentially, becoming more sophisticated and available at lower costs as they mature.



Exponential vs. Linear Growth

The Roadmap identifies five key technology drivers which are already affecting the transportation landscape. To proactively plan and effectively respond to these, it is critical to first understand these agents of change, which are:

- Connected
- Electric
- Shared
- Autonomous
- Data



Connected

The ability to communicate information real-time between mobility modes, infrastructure, users, and any other component critical to the movement of people and goods.

5G and the Internet of Things are the next generation of communications technology that promise ubiquitous connectivity for transportation networks. Communications standards, such as Vehicle to Infrastructure (V2I), Vehicle to Vehicle (V2V), and Vehicle to Everything (V2X) are forming the basis of digital connectivity needed to support future transportation modes and models. These technologies are being applied to a variety of applications, including transit, freight, and safety-critical features such as forward collision warning and forward intersection assist.



Electric

A vehicle or infrastructure that uses stored or transmitted electricity to power a vehicle instead of traditional internal combustion engines (ICE), usually by means of batteries.

Electric vehicles can utilize any number of domestic power sources to operate, including renewables like wind and solar, carbon-free sources like nuclear and even fossil fuels like natural gas and coal. Moving to electrified vehicle fleets means there is flexibility to add new and cleaner energy sources when new ones become available. Bloomberg New Energy Finance has found that since 2010, the cost per kWh has fallen approximately 87 percent and is forecasted to continue, making electric vehicles cost-competitive with internal combustion engine (ICE) vehicles around 2024. This drop in price will likely create a strong economic incentive to switch, as vehicles will have greater range, shorter charging times, and longer battery life.



Shared

Transportation services and resources that are shared among users, either as a shared vehicle or a shared trip.

Enabled by technologies such as wireless communications and smartphones, the trend toward shared mobility has continued to gain traction, especially in urbanized areas, with the Bay Area as a hotbed of innovation in this space. The shared mobility trend encompasses both the sharing of vehicles and the sharing of trips, and includes transit, microtransit, TNC's, docked and dockless scooters and bicycles, and carshare. Shared modes and services work most efficiently in dense areas, meaning urbanized areas have seen the largest adoption rates, while suburban and rural areas may require innovative approaches or government assistance to develop shared mobility options.



Data

Information generated by the vehicle, infrastructure, or user that can be used for decision-making, analysis, or operation of transportation.

The transportation system has the potential to generate enormous amounts of data, ranging from vehicle operational data, system-wide information gathered from sensors and Intelligent Transportation System (ITS) infrastructure, to passenger-focused data such as payments, tolling, pricing, and trip planning. Data is becoming the currency of the future transportation system, and is a key enabler of other technologies such as automation. Governments can utilize information to better manage assets, manage traffic, and to optimize their service offerings.



Autonomous

Vehicle automation for the purpose of transporting people and goods that can navigate and operate without assistance from a human driver or operator.

Automation is a suite of technologies that enables a vehicle to operate independently of human intervention, and this capability does not lend itself to one form of vehicle, mode, or service model over another. This means autonomous vehicles could be privately-owned and operated similar to a single occupancy vehicle, or they could be part of a robo-taxi fleet that provides mobility by trip or subscription. Further still, these technologies could be applied to a transit vehicles such as buses and shuttles to enable lower operating costs and better service for passengers. The opportunities and challenges of automation are highly dependent on the forms it takes and how consumer preference and government policies shape the landscape for this technology.

Emerging Mobility

Examples of emerging modes and services

The categories below represent the modes and services where emerging technologies are being applied.

Connected
Electric
Autonomous
Shared
Data

Several emerging mobility applications, which build off the technology drivers outlined in the previous section, are being developed that can potentially change mobility access and options in Alameda County.

Several factors can influence how these mobility types are adopted, including differences in development density, land use and the progress of technologies over time. Transportation behavior of users is also a factor, particularly when it comes to mode choice.

The technologies are also highly interrelated including aspects of Mobility as a Service (MaaS), Autonomous Vehicles, Connectivity, Micromobility, and Electrification. As adoption of technology takes place, each will further support the greater mobility network.

The modes emerging from these technologies fall into four categories; personal vehicles, passenger, transit, and goods movement. These are not exhaustive categories, but represent the key trends in mobility that these technologies are being applied to.

Increasing the application of technology to different mobility types can shift the paradigm away from private vehicle ownership and single occupancy vehicles. New and emerging modes and service types will continue to evolve, providing both opportunities and challenges to Alameda County.

Personal Mobility modes and services

These smaller personal mobility options are typically part of a network of shared vehicles and include docked and dockless bikes, e-bikes, and scooters. Other emerging mode types are being tested that enable automated repositioning back to a charging area or a destination. The modes are typically battery-electric powered, wirelessly connected and GPS enabled, making them appropriate for short trips.

Coordinated alongside transit, and potentially incorporated into mobility hubs, these vehicles can address the first mile / last mile needs of transit riders, effectively increasing the catchment area of each transit stop.



Micromobility Lime scooters

Passenger modes and services

A movement toward shared vehicles and trips, combined with emerging concepts such as connected, electric, and autonomous technologies could increase the market for MaaS in Alameda County. This service model is best seen in the TNC's currently operating in the county, with both the benefits and consequences that accompany, including greater access to mobility, but also concerns of traffic, equity, and curb management. A key piece is digital access, which will allow travelers to access multiple modes, including personal mobility and transit through a single platform.



Autonomous MaaS

Transit modes and services

Electric, connected, and autonomous transit vehicles have been tested and deployed in communities throughout the country. The vehicles feature advanced sensor technology to detect their environment and the vehicle's position within it. Vehicles can operate under a number of different service models, including circulator, skip-stop, and demand responsive, lending a high degree of flexibility for how they could be deployed. The use of autonomous full-sized buses is now being tested globally and could eventually integrate into compatible corridors. This will change the long-term service and operational opportunities for public transportation.



Autonomous articulated transit bus

Goods Movement modes and services

With advances in urban freight, small-scale autonomous delivery devices will quickly alter the way package delivery works, and how these vehicles operate on the roadway. The terrestrial drones that operate autonomously for package delivery are being tested throughout the country by all major corporate delivery companies including Amazon, FedEx and UPS.

Technology will also have significant impacts on freight movement and supply chains. Trucking is likely to be at the leading edge of the AV adoption curve, due to earlier implementation opportunities on interstate highways.



Tesla electrified freight trucks

Initiatives

Overview

The Initiatives are the primary outcome of the New Mobility Roadmap; they contain discrete actions that will direct the work of Alameda CTC and partner agencies as they implement new mobility technologies and services in Alameda County over the coming years. Each Initiative addresses a major area of new mobility and includes clear next steps: Programs, policies, pilots, and projects to initiate or coordinate with member jurisdictions, transit agencies, or regional partners. A list of potential actions was developed. Each action was designed to be both specific and realistic enough to implement.

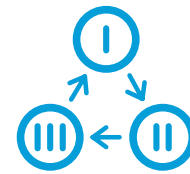
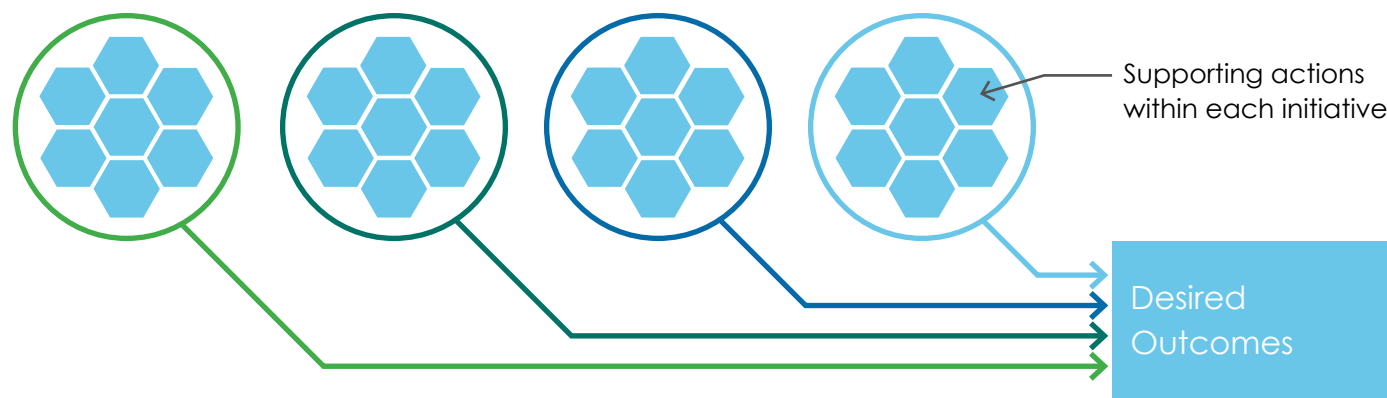
The Roadmap was reviewed by the Technology Working Group (TWG): staff with experience delivering New Mobility projects

Actions leverage coordination opportunities, align with local and regional efforts including those lead by the Metropolitan Transportation Commission (MTC), member jurisdictions, transit agencies, and other programs and projects led by Alameda CTC.

Related actions are grouped into seven major Initiatives that together define a roadmap for what Alameda CTC could pursue in close partnership with jurisdictions, transit agencies and Caltrans over the next five years related to new mobility.

The following spreads outline the actions developed to support each Initiative, along with an action dependency for each Initiative. Any action can be addressed on its own, and the action dependency is intended to show the interrelation of actions and suggested, but not mandatory path to implementation.

Initiatives and Actions



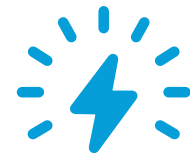
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Transportation Demand Management (TDM) Initiative aims to support a holistic Countywide TDM Program integrating Alameda CTC's TDM efforts with local and regional TDM programs to focus on both traditional tactics for managing travel demand and Active Transportation Demand Management (ATDM) strategies that leverage data and incentives, supported by digital platform(s), to shift traveler behavior.



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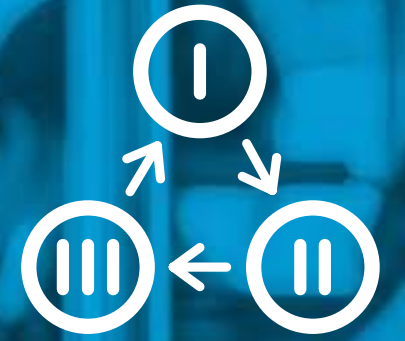


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1 TRANSIT INTEGRATION INITIATIVE



The Transit Integration Initiative aims to identify and improve a network of major transit corridors to support transit as it evolves. These corridors could include: signals that prioritize public transit vehicles; multimodal hubs that have first mile/last mile connections; and ITS infrastructure equipped to enable new and emerging modes of transit, e.g. connected and/or automated vehicles. For travelers, this will result in more reliable, frequent, and faster service, with more options for first mile/last mile connectivity to their destination.

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There are many emerging services and technologies creating opportunities to improve transit to make it a more attractive and preferred travel choice that could be considered for inclusion in this Initiative. They offer opportunities to improve travel times and reliability, consolidate ticketing and payment, and improve comfort for riders.

1.1

Establish a network of major transit corridors or future-ready corridors across the county to facilitate prioritizing transit technology installation and integration.



1.2

Establish a countywide Corridor Transit Signal Priority (TSP) program, including EVP functionality, to enable effective cross-jurisdictional or long corridor transit operations. This effort can be spearheaded by a pilot corridor TSP project that builds on existing efforts to inform the scaled-up TSP program.



1.3

Explore the potential for mobility hubs to provide first mile/last mile mobility that will better connect passengers to major transit networks, potentially facilitating partnerships between private sector mobility providers and member agencies to develop innovative approaches to first mile/last mile connections to transit.



1.4

Support and leverage the rollout of Clipper 2.0 to include a broader array of mobility services in Alameda County to consolidate mobility planning, booking, and payment (including for parking) under a uniform platform, and in combination with Alameda County's TDM program.



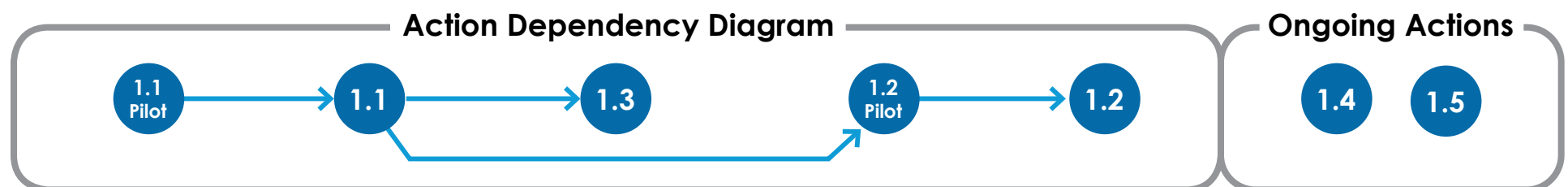
1.5

Identify ways to better support seniors and populations with disabilities using new mobility services and expanding technology options to be incorporated into Alameda CTC's Paratransit program.



Goals

- Multimodal/High Occ.
- Safety
- Environment
- Equity/Accessibility
- Service Quality
- Cost Efficiency
- Connectivity
- Economy
- Data Sharing/Security



2

COORDINATED INTELLIGENT TRANSPORTATION SYSTEMS (ITS) INITIATIVE



Coordinated Information Technology Services (ITS) Initiative aims to modernize ITS for Alameda County through promoting compatibility for the physical ITS infrastructure, applications, and communications across jurisdictions and transit agencies. Advanced ITS on Alameda County roads is essential to deploy and support new mobility technologies and services and maximize the capacity and use of the existing transportation system.

This effort will work towards a consistent ITS system on cross-jurisdictional corridors, enabling enhanced functionality for safe and efficient traffic flow and other functions such as Transit Signal Priority (TSP), Freight Signal Priority (FSP) and Emergency Vehicle Preemption (EVP). It will also consider the critical infrastructure necessary to

support the next generation of mobility technologies, such as connected vehicle applications and autonomous mobility. Benefits of a coordinated ITS system include better travel times for all modes, dynamic traffic management, increased safety, and the ability to prioritize the travel of freight, transit, and emergency vehicles, as needed. Additionally, a coordinated system can optimize the utility of existing infrastructure by adding the future capacity to accommodate new modes, automated and connected vehicles, and new technologies such as adaptive signal controls.

Benefits of a coordinated ITS system include better travel times, dynamic traffic management, increased safety, and the ability to prioritize the travel of freight, transit, and emergency services, as needed.

2.1

Develop a countywide ITS strategy to coordinate system functionality across jurisdictions, identify needs and gaps, and prioritize ITS infrastructure investments. This will include a technology infrastructure inventory to understand current systems and planned improvements, countywide ITS standards to define functionality and compatibility, approaches for public/private partnerships, and functionality such as Transit Signal Priority (TSP) and Emergency Vehicle Preemption (EVP).



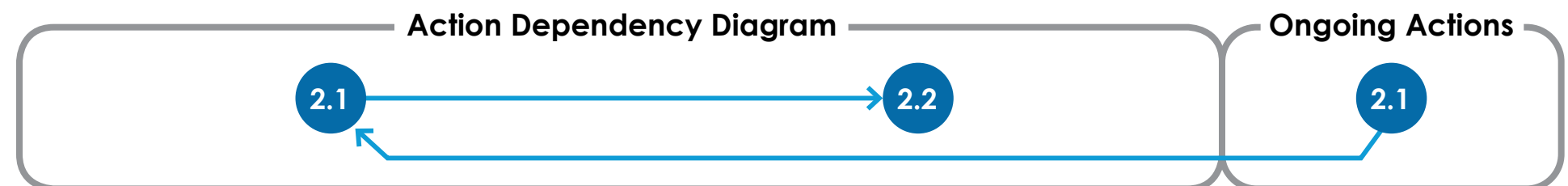
2.2

Promote Freight Signal Priority (FSP) on major or congested established truck routes and within impacted communities to reduce pollution and maintain efficient movements.



Goals

- Multimodal/High Occ.
- Safety
- Environment
- Equity/Accessibility
- Service Quality
- Cost Efficiency
- Connectivity
- Economy
- Data Sharing/Security



3

TRANSPORTATION DEMAND MANAGEMENT (TDM) INITIATIVE



Transportation Demand Management (TDM) Initiative would strive to develop a holistic Countywide TDM Program integrating Alameda CTC’s TDM efforts with local and regional TDM programs to focus on both traditional tactics for managing travel demand and Active Transportation Demand Management (ATDM) strategies that leverage data and incentives, supported by digital platform(s), to shift traveler behavior.

Travel Demand Management is a collection of strategies used to influence and alter traveler behavior, shifting the time, mode, or route of trips to relieve congestion and improve effectiveness of the overall transportation system. It is a way to maximize capacity from the existing transportation infrastructure.

Anticipated outcomes include fewer vehicles on the road, especially during peak times, less congestion, less pollution, and a greater shift toward transit and other non-single-occupant vehicle (SOV) modes.

ATDM can include multiple approaches spanning demand management, traffic management, parking management, and efficient utilization of other transportation modes and assets; most of them dynamically. Travelers would have access to real-time travel information to make informed decisions on travel options, along

with an array of incentives for behavior change. Anticipated outcomes include fewer vehicles on the road, especially during peak times, less congestion, less pollution, and a greater shift toward transit and other non-single-occupant vehicle (SOV) modes. This effort is supportive of Senate Bill 743, and aligns with the

environment goal to support sustainability, promote convenient non-auto modes, and reduce vehicle miles traveled.

3.1

Support and advocate for the integration of regional platforms and efforts into TDM programs throughout Alameda County to enable greater access and greater variety of mobility choices, e.g. Clipper 2.0, Clipper Start, and Mobility as a Service (MaaS), Seamless Bay Area, new and emerging ATDM platforms.



3.2

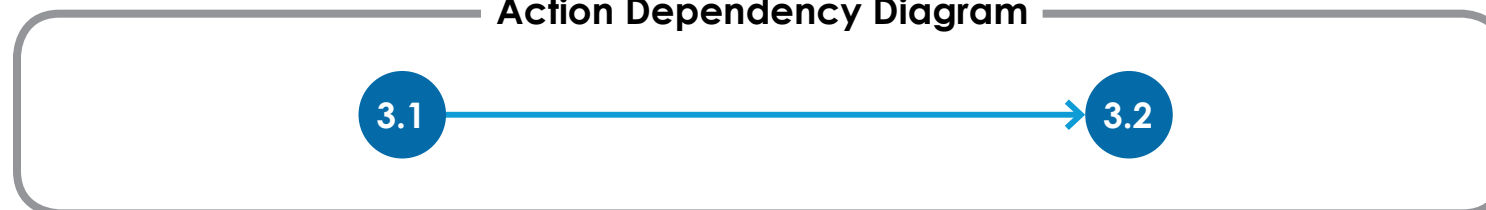
Explore and identify most effective policy tools to support shared vehicles and trips and support development and adoption at appropriate jurisdictional level.



Goals

- Multimodal/High Occ.
- Safety
- Environment
- Equity/Accessibility
- Service Quality
- Cost Efficiency
- Connectivity
- Economy
- Data Sharing/Security

Action Dependency Diagram



4

ELECTRIC MOBILITY INITIATIVE



Electric Mobility Initiative is intended to establish a coordinated approach to promoting electrified mobility for a range of modes. The Initiative will work to encourage electric vehicle charging stations in strategic locations to improve user access, facilitate electrification of fleet vehicles, and test and promote manufacturer-agnostic charging technologies.

It is widely recognized that the shift to electric vehicles is currently underway, and Alameda CTC has an opportunity to accelerate this shift and support electrification of the transportation sector in an efficient manner. Electrified mobility's market share is growing; as the cost of battery storage continues to drop, it will become more competitive with fossil-fuel vehicles. This effort will work towards establishing a network of charging facilities, thus incentivizing adoption and preparing the county for the accelerated adoption of electrified mobility.

Alameda CTC has an opportunity to accelerate the shift to electric vehicles and support electrification of the transportation sector in an efficient manner.

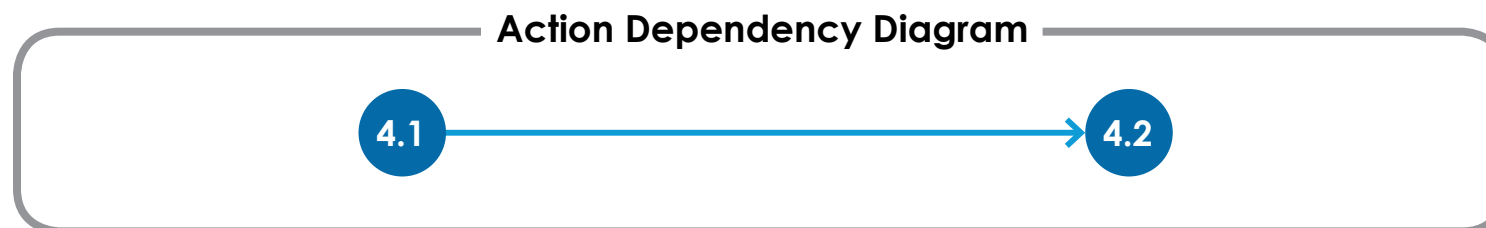
4.1

Develop a countywide transportation electrification strategy to support the shift to electrified mobility. This strategy should include approaches to ensure resiliency of an electrified transportation system, including on-site electricity generation and micro-grids.



4.2

Support electrified heavy vehicle charging infrastructure to serve freight services, transit and other electrified heavy vehicles.



Goals

- Multimodal/High Occ.
- Safety
- Environment
- Equity/Accessibility
- Service Quality
- Cost Efficiency
- Connectivity
- Economy
- Data Sharing/Security

5 EQUITY AND ACCESSIBILITY INITIATIVE



Equity and Accessibility Initiative aims to support new mobility as a tool to promote equitable outcomes for Alameda County communities. The approach will identify mobility needs and gaps in disadvantaged communities and where new mobility technologies could meet those needs/fill those gaps, identify challenges that result in people being left without mobility access and how to avoid those moving forward, and explore how to prevent new mobility from exacerbating existing inequalities.

Transportation plays a critical role in promoting equity by providing access to opportunities, but in some cases transportation projects and innovations have also created barriers, disrupted communities and exacerbated inequality. As new, potentially disruptive, modes and technologies play a larger role in Alameda County's transportation ecosystem, a better understanding of the needs and potential impacts on disadvantaged communities should be developed.

This Initiative will identify ways in which innovations in transportation can be leveraged to address social disparities and current inequalities. This program is intended to ensure equitable access to transportation for all community members, and establish equity as a key metric in new mobility projects, pilots, and programs. This process will be guided by an Equity Policy Guide for new mobility a level of service standard with an equity focus, to define the basic components and standards of equity-focused mobility.

This program is intended to ensure equitable access to transportation for all community members, and establish equity as a key metric in new mobility projects, pilots, and programs.

5.1

Identify ways to incorporate equity considerations into outreach and engagement efforts around new mobility to understand, coordinate, and address mobility challenges on an on-going basis.



5.2

Engage local experts in the Bay Area and use existing research to identify equity and accessibility issues that may be created or intensified by new mobility modes or services and ways of addressing challenges.



5.3

Identify "Mobility Deserts" where community members or population groups have inadequate or limited access to needed mobility options.



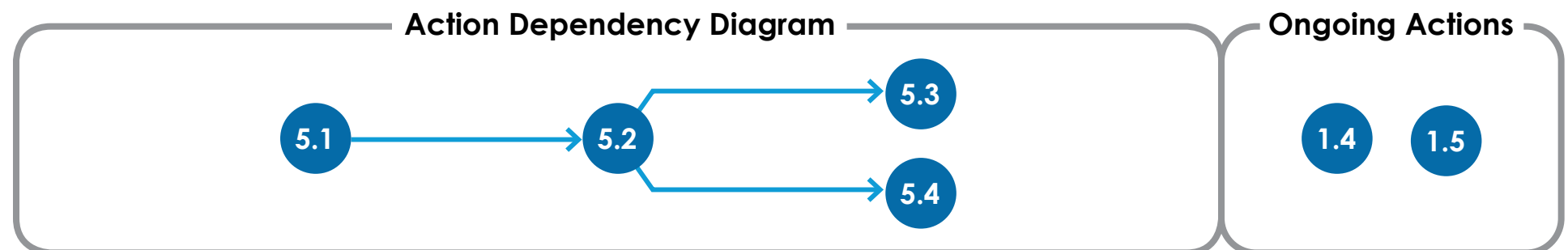
5.4

Explore equity related policies and efforts for new mobility technologies and services, and develop an Equity Policy Guide for Alameda CTC, local jurisdictions and transit agencies to apply in projects. This should include minimum standards of service for mobility providers, universal accessibility standards for mobility-related digital interfaces that address different barriers to use, and a guidance for evaluating new mobility related projects for equity impacts.



Goals

- Multimodal/High Occ.
- Safety
- Environment
- Equity/Accessibility
- Service Quality
- Cost Efficiency
- Connectivity
- Economy
- Data Sharing/Security



6

MOBILITY COORDINATION AND INNOVATION INITIATIVE (1/2)



Mobility Coordination and Innovation Initiative is intended to produce a framework to explore and facilitate the sharing of knowledge and guidance to effectively address new mobility, especially in areas where a coordinated approach is critical. It will also seek to support innovative approaches to mobility by local jurisdictions and transit agencies.

This Initiative is intended to capture the innovative ecosystem within the Bay Area, and direct those innovations to improve mobility options and effectiveness within Alameda County. This can be accomplished through engaging the private sector as a partner, creating a framework for matching their innovations to meet community needs and facilitating implementation. The outcome of this Initiative is expected to be a streamlined process for testing, deploying, and learning from innovative mobility concepts, and better applying those advances to future projects for the benefit of the County's communities.

This Initiative is intended to capture the innovative ecosystem within the Bay Area, and direct those innovations to improve mobility options and effectiveness within Alameda County.

6.1

Develop a systematized approach to coordinate local and regional piloting efforts through piloting process hub where agencies can share template agreements and processes to share experience, knowledge, best practices and approaches to matching community needs to private sector expertise. This hub can also be used to identify best practices to move from pilot to full deployment and evaluation frameworks to understand the potential equity and accessibility impacts of new mobility pilots. The piloting efforts will support the following potential pilot projects that support the New Mobility Roadmap Initiatives, including:

- Mobility Hub Pilot that will test and evaluate effective approaches to connecting travelers to transit.
- Electrified Arterial Corridor Pilot to support stationary and innovative charging technologies, and to explore the inclusion of micro-mobility charging infrastructure.
- Electrified Freight Charging Pilot to test different approaches and charging technologies related to electrified freight.
- Equitable and Accessible Mobility Pilot in under-served communities to explore innovative approaches to mobility such as community rideshare, shared mobility, and microtransit, potentially integrated within Alameda CTC's existing Paratransit program.

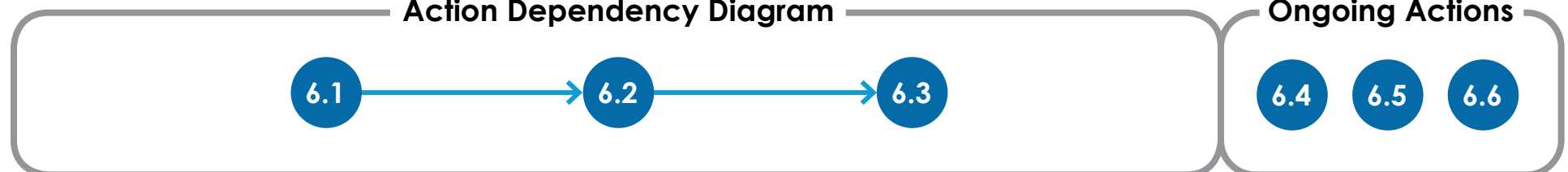
- Innovative Transit Pilot to test emerging concepts, such as autonomous and connected transit vehicles, data and information applications, and different modes of operation such as demand responsive transit service.
- Right-of-way Allocation Pilot to rapidly test how new modes fit into the existing right of way, and how interactions between these modes can be made safer.
- Innovative Major Transit Corridor that combines emerging transit concepts, advanced enabling infrastructure, charging infrastructure, and first mile/last mile mobility options integrated into mobility hubs.



Goals

- Multimodal/High Occ.
- Safety
- Environment
- Equity/Accessibility
- Service Quality
- Cost Efficiency
- Connectivity
- Economy
- Data Sharing/Security

Action Dependency Diagram



6

MOBILITY COORDINATION AND INNOVATION INITIATIVE (2/2)



6.2

Create an innovation sandbox and grant program to prototype and pilot innovative mobility concepts in Alameda County.



6.3

Establish a formal Technology Working Group (TWG) to become an on-going round-table to share best practices and coordination with regional and local efforts and facilitate spearheading implementation of the New Mobility Roadmap and associated projects, pilots, and programs. The TWG will advise on and advocate for coordination between local jurisdictions and transit agencies, and working with regional and state entities as appropriate. In addition, the TWG will guide development of best practices for future-proofing, pricing framework for incentivizing behavior, and key policy guidance efforts as identified below:

- Parking – Explore creative and effective strategies to address parking issues, such as advanced parking management deployed by jurisdictions and best practices for parking and development policies related to the impacts of new mobility.
- Curb Management - Explore creative and effective curb management strategies as part of corridor studies and share lessons learned with jurisdictions



6.4

Engage in and advocate as needed for the County's shared interests to regional and state entities for regional and state legislative and policy efforts, and to address the potential negative impacts of emerging modes and services on labor, mode interactions, and impacts on the greater transportation system.



6.5

Explore and identify effective ways to work with Transportation Network Companies (TNC's) and navigation platforms and engage with them to reduce the traffic and congestion impacts on community streets.



6.6

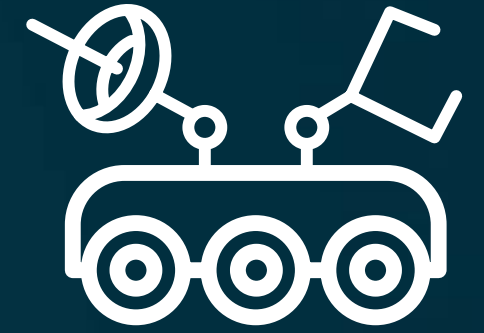
Explore options to develop a resiliency guidance to identify risks, vulnerabilities, and mitigation efforts for technology-enabled infrastructure, new mobility modes, and cyber security to ensure Alameda County's transportation system continues functioning when disasters occur. This effort should be coordinated with MTC's Regional Communication Plan to ensure redundancy where possible.



Goals

- Multimodal/High Occ.
- Safety
- Environment
- Equity/Accessibility
- Service Quality
- Cost Efficiency
- Connectivity
- Economy
- Data Sharing/Security

7 DATA AND AUTOMATION INITIATIVE



Data and Automation Initiative identifies ways for agencies in Alameda County to address the emerging trend towards vehicle automation within the county’s transportation system, and the proliferation of data made available by new mobility technologies and services.

The automation of transportation will be one of the most consequential changes to the transportation system since the advent of the automobile, ushering in changes ranging from land use and development to shifts in how infrastructure is prioritized. The effects of automated mobility will be far-reaching, and its launch should be targeted to meet the intent of the adopted new mobility goals. While data is not a new topic, the amount and pervasiveness of transportation-related data is a trend that Alameda CTC will need to manage and address.

The effects of automated mobility will be far-reaching, and its launch should be targeted to meet the intent of the adopted new mobility goals.

7.1

Develop a Data Sharing and Security guidance for jurisdictions and transit agencies within Alameda County based on efforts and best practices at the regional and state levels.

- Identify and establish the role for Alameda CTC, jurisdictions and transit agencies related to data sharing and data security within the County.
- Explore options for a data sharing framework to facilitate data exchanges between mobility operators, data users, and local governments and transit agencies.
- Engage in state and regional efforts to develop Personally Identifiable Information (PII) best practices, and standards for the transparency of data collection methods and type of data collected on travelers.



7.2

Develop an automated vehicle strategy to facilitate the rollout, application and use of autonomous modes within Alameda County, including an infrastructure needs assessment for AV-related infrastructure. This strategy should address automated and connected freight movements, including human-piloted platoons and fully automated vehicles, as well as guide the implementation of automated first mile/last mile delivery and how right-of-way allocations are affected.



7.3

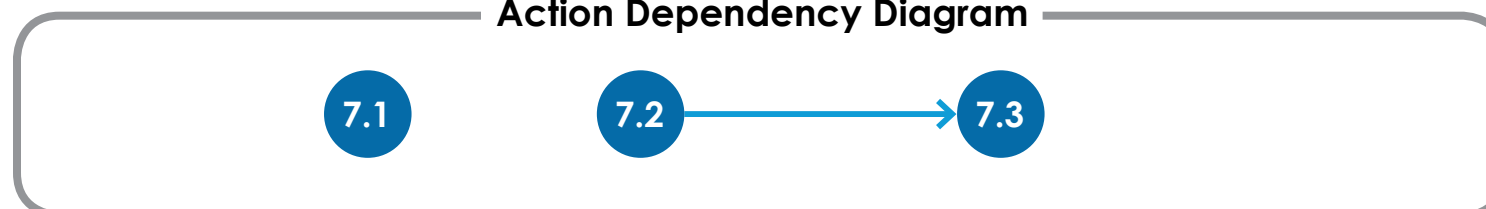
Engage in state or regional efforts regarding automated vehicle pricing policy to guide a consistent approach and appropriate adoption in the County to AV mobility service fees and behavior incentives including incentives towards shared use to maximize efficiency of the system and avoid increased congestion that could be created by widespread adoption of personal AVs.



Goals

- Multimodal/High Occ.
- Safety
- Environment
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Action Dependency Diagram



NEAR-TERM PRIORITY ACTIONS

Prioritization Approach

These Near-Term Priority Actions were selected based on application of the following prioritization factors.

Relationship to Goals – While the full suite of identified actions has been designed to fully realize the outcomes defined in the goals, some actions provide cross-cutting benefits and can quickly provide broad benefits. With this in mind, as a first step, every action has been evaluated against the entire set of goals in addition to its primary goal.

Urgency/Readiness – The relative urgency of each action and its ability to capitalize on existing opportunities was assessed based on the following criteria:

- **Opportunity for Action** – Does the current environment/ecosystem warrant an urgent action on the part of Alameda CTC or member jurisdictions and agencies?
- **Readiness** – The technology development is sufficiently advanced that work will not become obsolete in the near-term.
- **Risk Avoidance** – Has a technology been introduced or evolved in a way that requires action to address or mitigate risks or negative outcomes?
- **Momentum** – Is there an existing effort underway within Alameda County or the Bay Area that an action can build upon?
- **Demonstrated Need** – Are there any extenuating circumstances that warrant additional focus or action now?



Pilot an innovative major transit corridor

to facilitate corridor-wide transit priority technology installation and integration. This will build on existing efforts and prepare the corridor to be “future-ready” by combining emerging transit concepts, advanced enabling infrastructure, charging infrastructure, and first mile/last mile mobility options (potentially including mobility hubs). This could create a foundation for a network of major transit corridors or future-ready corridors across the county.



Develop a countywide transportation electrification

strategy to support the shift to electrified mobility. This strategy should include approaches to ensure resiliency of an electrified transportation system, including on-site electricity generation and micro-grids.



NEAR-TERM PRIORITY ACTIONS



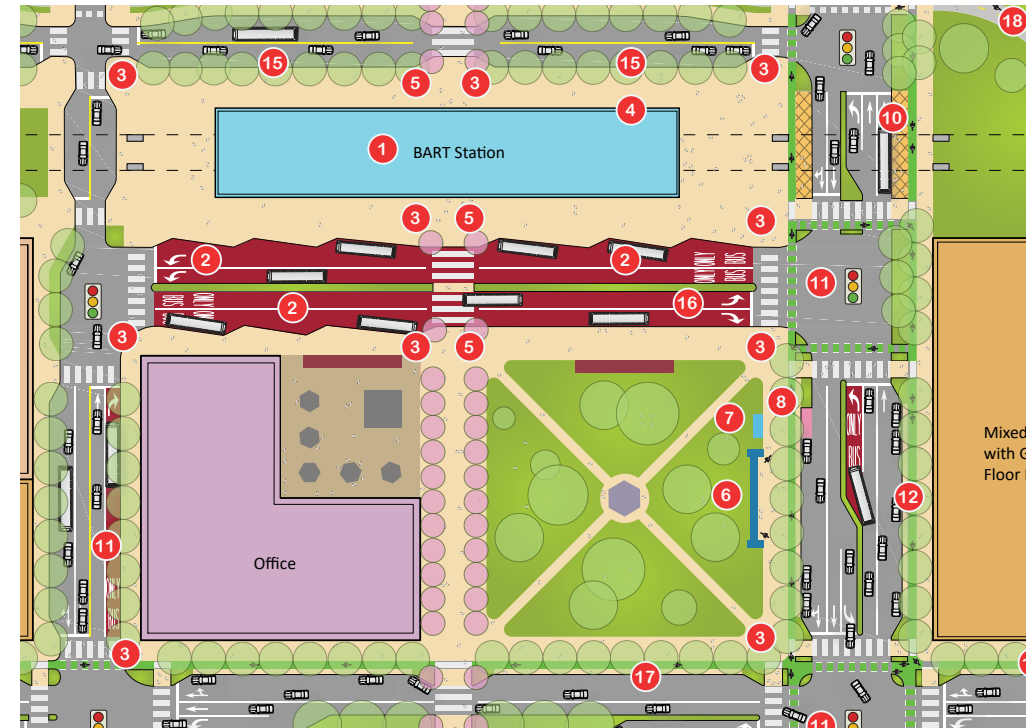
Develop a Countywide ITS strategy to coordinate system functionality across jurisdictions and identify needs and gaps related to ITS infrastructure.

This will include a technology infrastructure inventory to understand current systems and planned improvements, countywide ITS standards to define functionality and compatibility, approaches for public/private partnerships, and functionality such as Transit Signal Priority (TSP) and Emergency Vehicle Preemption (EVP).



Explore and gather equity-related best practices and efforts related to new mobility technologies and services.

This could include minimum standards of service for mobility providers, universal accessibility standards for mobility-related digital interfaces that address different barriers to use, and a guidance for evaluating new-mobility-related projects for equity impacts. This could eventually feed into a set of guidance that local jurisdictions and transit agencies can use in new mobility related projects.



Pilot a Mobility Hub

building on existing local and regional efforts that will test and evaluate effective approaches to connecting travelers to transit hubs.



Establish a formal Technology Working Group (TWG)

to become an on-going round-table to share best practices and coordination with regional and local efforts and facilitate spearheading implementation of the New Mobility Roadmap and associated projects, pilots, and programs. The TWG will advise on and advocate for coordination between local jurisdictions and transit agencies, and working with regional and state entities as appropriate. In addition, the TWG will guide development of best practices for future-proofing, pricing framework for incentivizing behavior, and key policy guidance efforts.



The Road Ahead

The New Mobility Roadmap is a first step in orienting Alameda CTC to deal with the changes currently happening in mobility, and a recognition of the impact these mobility changes can have on Alameda County communities.

The Roadmap represents a current understanding at a particular moment in time, and in an area defined by constant change in innovation, the ability to plan for these changes will be impacted by advances that may not yet be evident. It will be important to continuously reevaluate the opportunities and risks posed by emerging technologies, and to continuously update this roadmap to meet the current needs of Alameda County.

This Roadmap provides the key Initiatives needed to respond to a changing world of technology, and provide Near-Term Priority Actions to coordinate and align Alameda CTC and partners on a plan of action.

Key outcomes of the Roadmap

- [Initiatives, a plan of action to manage uncertainty](#)
- [Near-Term Priority Actions, critical starting points](#)
- [A continuing resource for on-going technology planning and implementation for all partners](#)

How to use the Roadmap

- [Strategic plan to harness opportunities and manage risks](#)
- [Identify and form partnerships](#)
- [Guidance and coordination on technology-related issues for Alameda County](#)

Special Thanks

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Mayor John Marchand

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Councilmember Sheng Thao

Councilmember At-Large Rebecca Kaplan

Mayor Robert McBain

Mayor Jerry Thorne

Mayor Carol Dutra-Vernaci

City of San Leandro

City of Emeryville

Alameda County, District 1

Alameda County, District 2

Alameda County, District 3

Alameda County, District 4

Alameda County, District 5

BART

City of Alameda

City of Albany

City of Berkeley

City of Dublin

City of Fremont

City of Hayward

City of Livermore, South

City of Newark

City of Oakland

City of Oakland, North

City of Piedmont

City of Pleasanton, South

City of Union City

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