



# AMP Next Steps | Priority Tactical Actions

This report includes documentation on Spring/Summer 2020 work with AMP Steering Committees on: Data and Data Sharing, System Operations and Shared Mobility and AMP Working Group recommendations on next steps.

*September 2020*



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MOBILITY  
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# Introduction

In spring 2020, the AMP Working Group and partner agency staff coordinated with stakeholders to establish three Steering Committees, each with a specific focus area relating to the priority tactical actions identified at the March 2020 AMP Executive Committee meeting. The three focus area Steering Committees are:

- **Data and Data Sharing** co-led by Ashley Nysten (CDOT) and Emily Lindsey (DRCOG)
- **Shared Mobility** led by Paul DesRocher (RTD)
- **System Operations** led by Greg MacKinnon (DRCOG)

Each Steering Committee met three times from May to July 2020. The Steering Committees broadly defined the committee's vision and purpose, reviewed priority tactical actions in their focus area and developed a process to further work on each action. AMP Steering Committee leads coordinated between the groups to ensure cross-tactical action activity themes were identified and foundational activities that crossed tactical actions were part of the discussion.

The AMP Working Group was updated monthly on the progress of the Steering Committees, including a meeting where AMP Steering Committee leads presented recommended processes by tactical action. The AMP Working Group reviewed and discussed next steps, outlined in this document, and completed a survey regarding priorities and next steps. Partner agencies collaborated as recommendations were developed to determine actionable next step recommendations presented here. A summary of the recommendations follows by tactical action.

Foundational work is needed for most of the priority tactical actions explored by the Steering Committees. Building elements from these activities into agency work plans will support advancing Mobility Choice Blueprint and the work of the Advanced Mobility Partnership. Additionally, staff evaluated information regarding resources required, potential risks and level of effort for each of the priority tactical actions. Given potential limitations due to financial resources, required foundational activities and staffing, AMP Working Group and partner agency staff evaluated the tactical actions and identified recommended next steps, which are highlighted in the document's [Recommended Next Steps](#) section. While lead agencies are identified to champion next steps, we are committed to working with partner agency staff across agencies on these efforts. The indication of "lead" signifies an agency will coordinate with partner agencies to implement.

## Priority Tactical Actions Overview

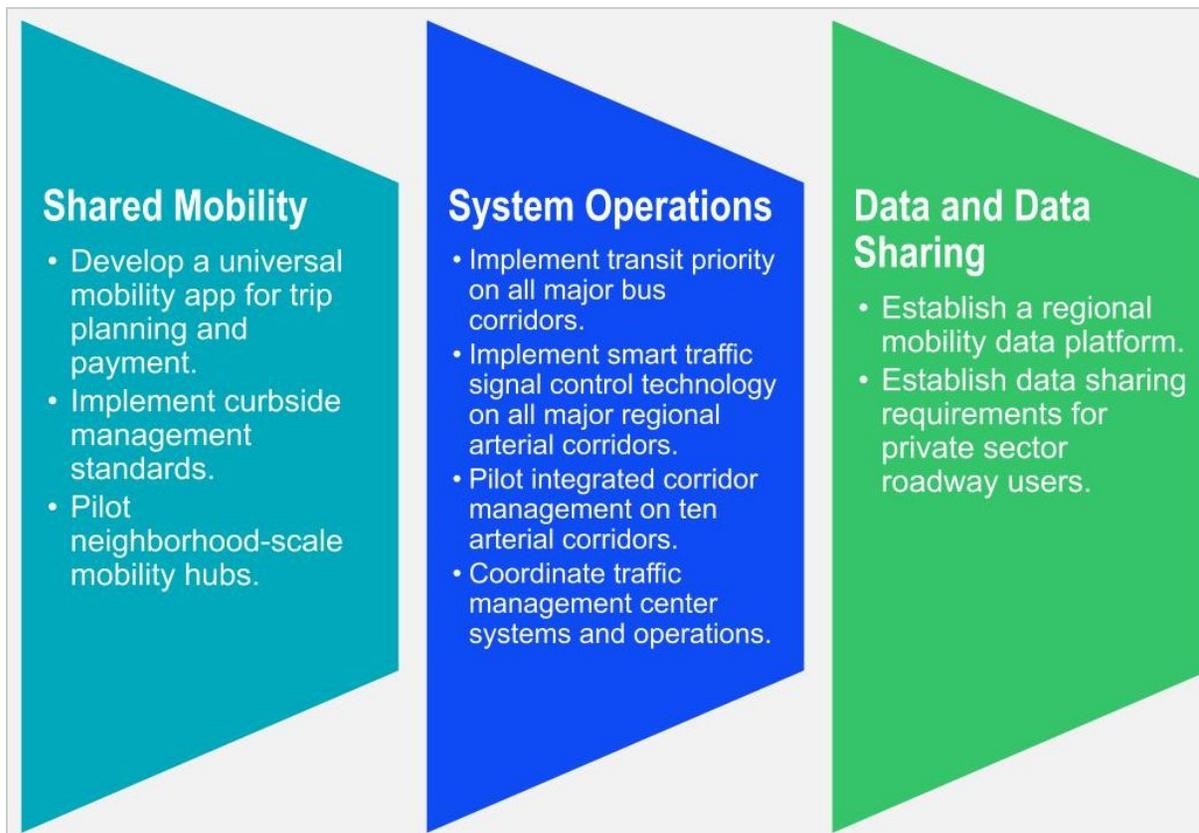
At the March 2020 AMP Executive Committee meeting, the group reviewed AMP Working Group recommended priority tactical actions. Initial information on these tactical actions was prepared as part of Mobility Choice Blueprint (2019). Costs for priority tactical actions will have to be revisited as specific scope and scale of projects are determined. For many of these actions, it is possible to move forward with pilots, scaled-projects or re-scoped projects. For example, most tactical actions intend to begin with a planning/visioning process and/or pilot projects before expanding to region wide applications.

ID	Tactical Action	Capital Expenditure (low-high)	Ongoing Expenditure Annual (low-high)	Staff Required
4.1	Establish a regional mobility data sharing platform.	\$6-8M	~\$0.5M	2
4.2	Establish data sharing requirements for private sector roadway users.	\$0.3-0.4M	-	Oversight
3.1	Develop a universal mobility app for trip planning and payment.	\$3-8M	\$0.4M-\$0.8M	1-2
3.4	Implement curbside management standards.	\$0.3-0.5M	-	Oversight
3.5	Pilot neighborhood scale mobility hubs.	\$1-5M	-	Oversight
2.4	Implement transit priority on all major bus corridors.	\$20-30M	~\$1M	4
2.5	Implement smart traffic signal control technology on all major regional arterial corridors.	\$120-170M	~\$5M	10
2.6	Pilot integrated corridor management on ten arterial corridors.	\$12-17M	~\$.5M	2
2.8	Coordinate traffic management center systems and operations.	\$20-30M	~\$3M	10

Source: Appendix A, Mobility Choice Blueprint

# Focus Areas and Steering Committees

There were three Steering Committees, each focusing on a specific area related to the priority tactical actions. The Steering Committee leads worked together to ensure continuity in conversations and recommendations across tactical actions in each focus area. The AMP Working Group looked at recommendations across all of the three focus areas. Per the recommendation at the March 2020 Executive Committee Meeting, proposed planning processes were developed to implement each tactical action. Many tactical actions include preliminary work around discovery, visioning and/or existing conditions ahead of policy development, pilot deployment and/or project implementation.



The AMP Working Group discussed how best to incorporate electrification into ongoing AMP efforts and recommend including a quarterly electrification briefing at the AMP Working Group meetings (beginning at the September 2020 meeting) instead of establishing a standalone electrification Steering Committee at this time. Stakeholders felt there are many ongoing efforts related to electrification and since it often crosses focus areas, the best way to collaborate on electrification related efforts is through the primary AMP Working Group.

## Data and Data Sharing

The AMP Working Group solicited guiding input from the AMP Steering Committee on Data and Data Sharing to develop these next steps. This Steering Committee met three times to discuss and develop the process; the group was made up of both public and private sector stakeholders. Early on, the group decided to address both data-related priority tactical actions together, under 4.1 as identifying data sharing requirements is a component that can be addressed as part of this action.

### *Establish a Regional Mobility Data Platform*

This tactical action was identified as having an impact on multiple other tactical actions and foundational to pursuing other tactical actions throughout Mobility Choice Blueprint. There was a very high level of stakeholder interest in pursuing activities around this tactical action and as such it was rated as a high priority across all tactical actions. As such, prioritizing work even in initial phases, was identified as an important initial activity that supports the AMP.

**Recommendation:** Focus AMP work right now on early phases:

Discovery and Planning/Visioning. CDOT and DRCOG will work collaboratively on this tactical action with CDOT taking lead in Discovery and DRCOG taking lead in Planning/Visioning. Work in these phases will inform future resource requests and platform development/ownership.

**Other Considerations:** Future resources will be required for both capital and operating expenses of a platform and will be driven by the scope identified during the discovery and planning/visioning phases.

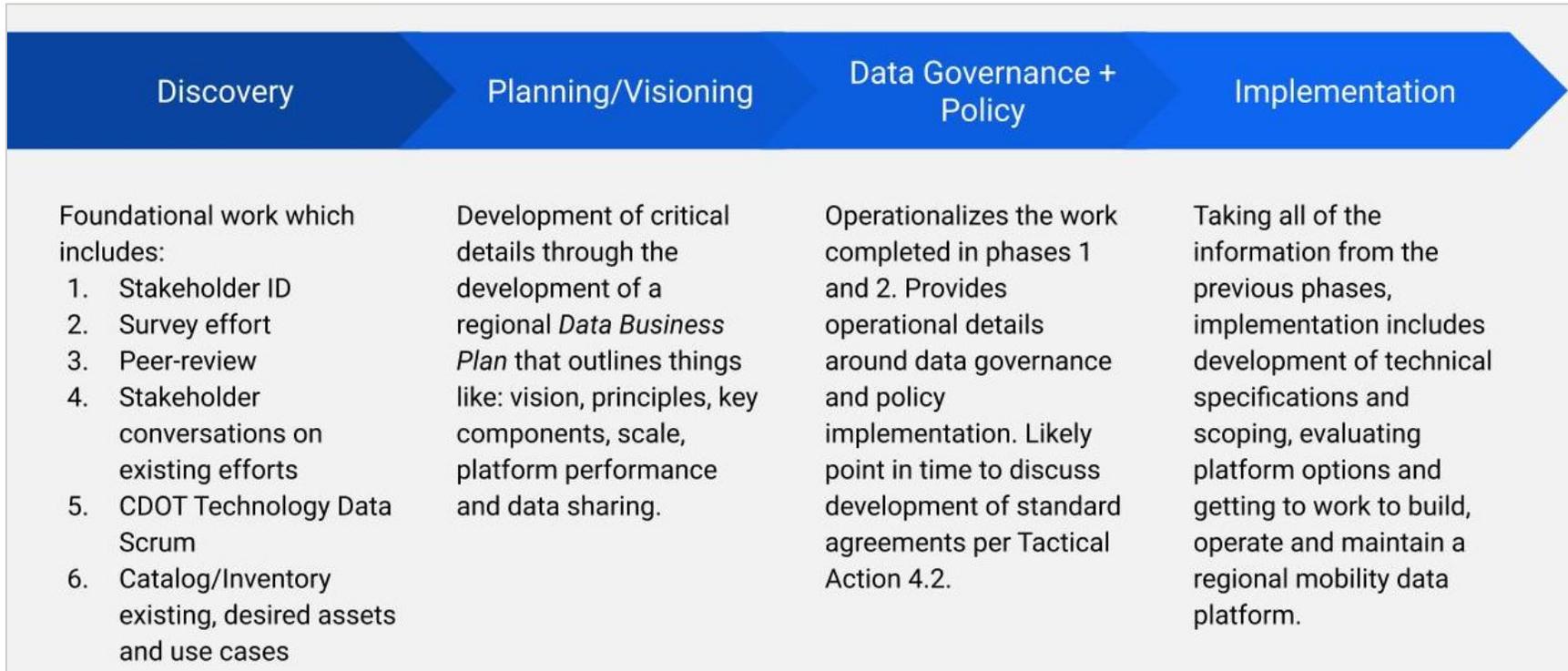
**Four Phased Approach: Discovery, Planning/Visioning, Governance, Implementation.**

**Early work can likely be completed under existing work plans, with minimal additional financial support.**

**Implementation work will require additional resources: platform development, ongoing maintenance, staff resources.**

**During development of regional data business plan consider Tactical Action 4.2.**

Proposed Planning Process: Establish a Regional Mobility Data Platform



*Additional details on the proposed activities are documented in the matrix.<sup>1</sup> Details include specific activities, proposed lead agencies, notes on existing work plans and potential resource needs.*

<sup>1</sup> <https://drive.google.com/file/d/1VxcuXk69dcJ9KV-NGTIsRe2FzwVa3dEE/view?usp=sharing>

## Shared Mobility

The AMP Working Group solicited guiding input from the AMP Steering Committee on Shared Mobility to develop these next steps. This Steering Committee met three times to discuss and develop the process; the group was made up of both public and private sector stakeholders.

### *Develop a Universal Mobility App for Trip Planning and Payment*

This tactical action was identified as having an impact on the Establishing a Data Sharing Platform and Piloting Neighborhood Scale Mobility Hubs tactical actions. There was a fairly high level of stakeholder interest in pursuing activities around this tactical action, specifically on partnering with private entities working in this area. As such, prioritizing work in initial phases was identified as an important activity that supports the AMP and would require minimal capital expenditure.

**Recommendation:** RTD will monitor opportunities and coordinate with stakeholders related to development of a universal mobility app for trip planning and payment and consider pursuing initial phases if funding and/or staff resources become available.

**Other Considerations:** A significant portion of discussion centered on the role of government in partnering with existing trip planning and payment apps such as Uber, Lyft, Transit, etc. Both RTD and CDOT are currently engaged with work that may inform this tactical action, including a recently funded FTA AIM grant to advance in 2021.

**Five-Phased Approach: 1. Visioning, Planning & Discovery, 2. Establishing Partnerships, 3. ID Requirements & App Development, 4. Outreach & Engagement, and 5. App Maintenance**

**Implementation work will require additional resources: app development, ongoing maintenance, & staff resources.**

**Consider the role of public/private partnerships early in process.**

Proposed Planning Process: Develop a Universal Mobility App for Trip Planning and Payment



Additional details on the proposed activities are documented in the matrix.<sup>2</sup> Details include specific activities, proposed lead agencies, notes on existing work plans and potential resource needs.

<sup>2</sup> <https://drive.google.com/file/d/1VxcuXk69dcJ9KV-NGTIsRe2FzwVa3dEE/view?usp=sharing>

### *Implement Curbside Management Standards*

This tactical action was identified as being impacted by the Establishing a Data Sharing Platform and Pilot Neighborhood Scale Mobility Hubs tactical actions. There was firm stakeholder interest in pursuing this tactical action, although it was observed that larger cities with more established parking management operations would have different, and perhaps more significant needs than smaller cities. Prioritizing work in early phases was identified as an initial activity that supports the AMP and would require minimal capital expenditure.

**Recommendation:** Focus AMP work right now on early phases: Planning and Visioning. Next steps include AMP partner agencies coordinating with member governments, such as Denver and Boulder, to understand past and current work in this space. AMP Working Group will facilitate discovery-focused presentations to learn more about existing local agency work and determine next steps. Work in early phases will inform resource and capital needs associated with implementing the proposed pilot and policy direction.

**Other Considerations:** DRCOG is currently (2020) developing a regional Complete Streets Toolkit, which may inform further work in regional curbside management. The City and County of Denver and the City of Boulder have multiple activities ongoing which may inform the early development of this tactical action.

**Four-Phased Approach: 1. Planning & Visioning 2. Pilot 3. Policy Development 4. Implementation**

**Early work can likely be completed under existing work plans, with minimal additional financial support.**

**Implementation work will require some additional resources, in particular during the pilot phase.**

**Consider unique needs of both urban and suburban member governments in development of policy.**

## Proposed Planning Process: Implement Curbside Management Standards



*Additional details on the proposed activities are documented in the matrix.<sup>3</sup> Details include specific activities, proposed lead agencies, notes on existing work plans and potential resource needs.*

<sup>3</sup> <https://drive.google.com/file/d/1VxcuXk69dcJ9KV-NGTIsRe2FzwVa3dEE/view?usp=sharing>

### *Pilot Neighborhood-scale Mobility Hubs*

There was significant interest in pursuing this tactical action, and it was noted that multiple agencies, including RTD, CDOT and local member governments have research or implementation projects currently in progress in this area.

**Recommendation:** RTD and CDOT will work collaboratively on this tactical action with significant input coming from local member governments and private operators. Work in the initial planning phase will inform resource and capital needs associated with implementing the proposed pilot and policy direction.

**Other Considerations:** The City and County of Denver has two Mobility Hub pilot projects near implementation, which may inform the early development of this tactical action. CDOT has secured funding for the implementation of several Mobility Hubs along I-25. CDOT's Division of Transit and Rail is also preparing a "Mobility Hub Guidebook," which will provide recommendations for elements to include when designing and operating a Mobility Hub in a community. CDOT's Office of Innovative Mobility is preparing a "Statewide Guide to Implementing Micromobility," which will help provide lessons learned and best strategies to incorporate micromobility modes into mobility hubs.

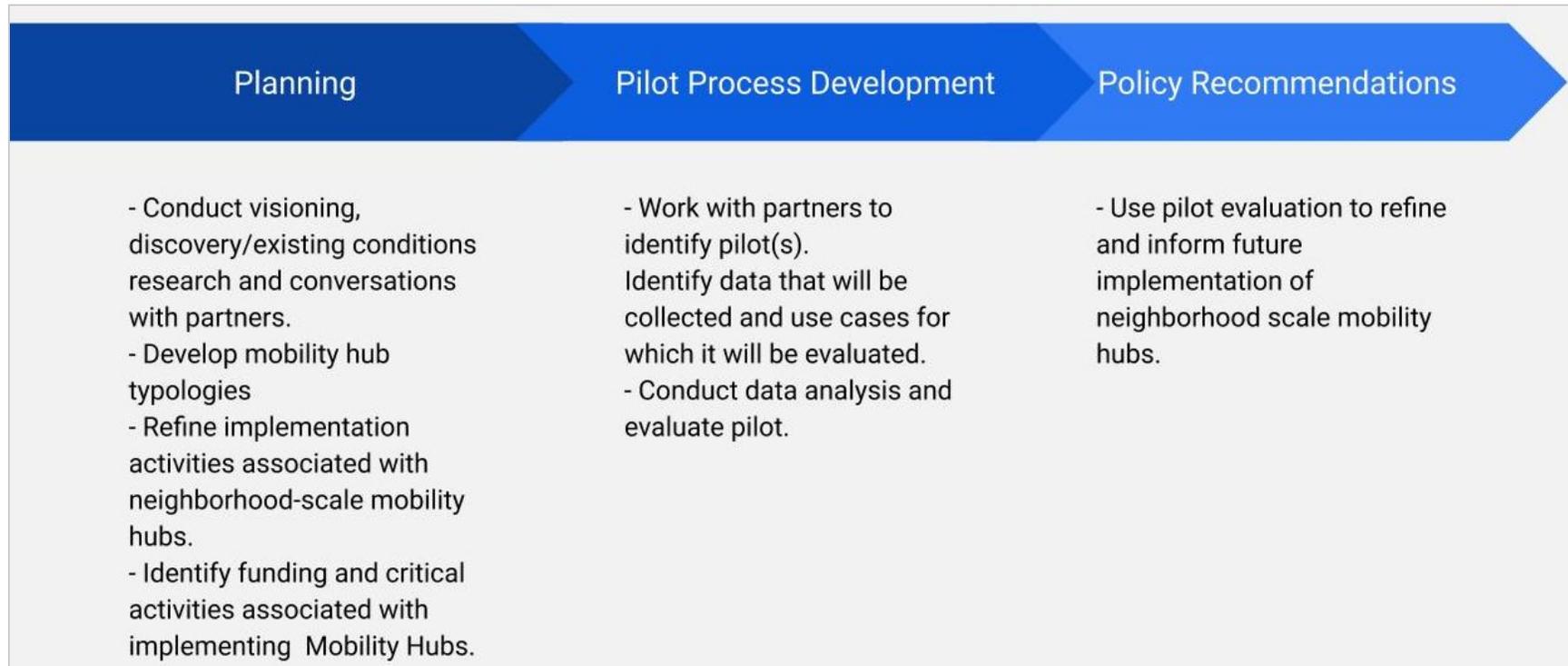
### **Three-Phased Approach: 1. Planning 2. Pilot 3. Policy Development**

**Early work can likely be completed under existing work plans, with minimal additional financial support. Implementation work will require some additional resources, in particular during the pilot phase.**

**Coordinate with private operators to determine potential partnerships in the pilot phase.**

**Consider land use and development contexts in development of multiple Mobility Hub types.**

## Proposed Planning Process: Pilot Neighborhood Scale Mobility Hubs



*Additional details on the proposed activities are documented in the matrix.<sup>4</sup> Details include specific activities, proposed lead agencies, notes on existing work plans and potential resource needs.*

<sup>4</sup> <https://drive.google.com/file/d/1VxcuXk69dcJ9KV-NGTIsRe2FzwVa3dEE/view?usp=sharing>

## System Operations

The AMP Working Group solicited guiding input from the AMP Steering Committee on System Operations to develop these next steps. This Steering Committee met three times to develop the process; the group was made up of both public and private sector stakeholders.

### *Implement Transit Priority on All Major Bus Corridors*

RTD recently completed a Regional Bus Rapid Transit Feasibility Study.<sup>5</sup> Each of the Tier 4 routes had additional analysis including: identification of proposed BRT-supportive improvements (dedicated lanes, TSP, etc.), route-specific service plans, ridership and VMT-R modeling, capital and operating estimates, equity and safety analyses. Additional prioritization and definition of transit priority projects<sup>6</sup>, which has led to TIP-funded implementations. This work can be fed into the process of pursuing this tactical action.

**Recommendation:** RTD, DRCOG and CDOT will monitor current and on-going project implementations. The primary purpose is twofold: determine and document common measures of success and confirmation of TSP technology standards and techniques.

**Other Considerations:** Transit priority is a collection of transit improvements, including components such as dedicated transit lanes, queue jumps, transit signal priority and mobility hubs. Transportation technology is a component rather than the leading factor. Major projects that support this tactical action have been funded at the regional level. Consideration of transit priority in DRCOG's 2050 Metro Vision Regional Transportation Plan may also inform action on this.

<sup>5</sup> <https://www.rtd-denver.com/projects/regional-bus-rapid-transit-feasibility-study>

<sup>6</sup> <https://www.rtd-denver.com/sites/default/files/files/2018-06/RTD-priorityCorridors-42018.pdf>

**Existing RTD planning documents and design guidelines serve as the current basis for execution of this tactical action.**

**Existing/on-going corridor implementations: Colfax Avenue, select US 36 ramps, Havana Street, Federal Boulevard.**

**Coordination with other tactical action work, like curbside management and mobility hub definitions, is required.**

## Proposed Planning Process: Implement Transit Priority on All Major Bus Corridors



*Additional details on the proposed activities are documented in the matrix.<sup>7</sup> Details include specific activities, proposed lead agencies, notes on existing work plans and potential resource needs.*

<sup>7</sup> <https://drive.google.com/file/d/1VxcuXk69dcJ9KV-NGTIsRe2FzwVa3dEE/view?usp=sharing>

## *Implement Smart Traffic Signal Control Technology on All Major Arterial Corridors*

This tactical action must support the other tactical actions identified here as initial priorities. As such, prioritizing work on early phases, visioning and planning, between the tactical actions is an important activity to advance the AMP. The TMC coordination tactical action will define the vision and services/processes to be deployed, which includes both the ICM and, transit priority technology tactical actions as well as advanced traffic signal coordination initiatives. This tactical action focuses on the definition and deployment of the infrastructure necessary to support the other tactical actions.

**Recommendation:** Building from TMC coordination tactical action, DRCOG will inventory existing conditions and, in coordination with CDOT, will lead definition of signal control technology standards to ensure the processes and functional requirements defined by the regional operations vision and philosophies are supported.

**Other Considerations:** Data sharing between jurisdictions and agencies is a core foundation to coordinate regional operations. Multiple technologies and systems are deployed in the region, which presents challenges for intersystem compatibility and coordination.

**The systems and devices deployed under this tactical will support other tactical actions.**

**Advanced traffic signal coordination initiatives include: transit signal priority, adaptive signal control and automated traffic signal performance measurement (ATSPM) systems.**

**Interjurisdictional coordination of signal operations continues to be a critical priority.**

Proposed Planning Process: Implement Smart Traffic Signal Control Technology on All Major Arterial Corridors



*Additional details on the proposed activities are documented in the matrix.<sup>8</sup> Details include specific activities, proposed lead agencies, notes on existing work plans and potential resource needs.*

<sup>8</sup> <https://drive.google.com/file/d/1VxcuXk69dcJ9KV-NGTIsRe2FzwVa3dEE/view?usp=sharing>

## *Pilot Integrated Corridor Management on Ten Arterial Corridors*

Integrated corridor management (ICM) is an integrated multi-jurisdictional and multi-functional response strategy to unplanned events supported by a decision support system. The primary ICM objective is to maximize efficiency and effectiveness of a corridor's ability to move travelers. The TMC coordination tactical action will define the vision and services/processes to be deployed, which includes ICM and incident management. This tactical action will be focused on the latter two services in support of the TMC coordination tactical action.

**Recommendation:** DRCOG will improve understanding of ICM development and application by hosting a workshop. Following directly from the workshop, DRCOG will lead the definition of ICM vision and a subsequent concept of operations.

**Other Considerations:** Interjurisdictional and interagency coordination depends on regional data sharing and TMC coordination processes. Additionally, CDOT's Traffic Incident Management (TIM) program has established a foundation for coordinating multiple TIM teams across the region.

**This tactical action requires coordination of local jurisdictions, CDOT and RTD based on a joint awareness of their respective real-time data.**

**This tactical action requires active monitoring and traffic management as well as interjurisdictional traveler information coordination.**

**This tactical action is an extension of existing traffic incident management practices.**

Proposed Planning Process: Pilot Integrated Corridor Management on Ten Arterial Corridors



*Additional details on the proposed activities are documented in the matrix.<sup>9</sup> Details include specific activities, proposed lead agencies, notes on existing work plans and potential resource needs.*

<sup>9</sup> <https://drive.google.com/file/d/1VxcuXk69dcJ9KV-NGTIsRe2FzwVa3dEE/view?usp=sharing>

## *Coordinate Traffic Management Center Systems and Operations*

This tactical action is the core Systems Operations initiative and it will impact the Data and Data Sharing focus area. As such, prioritizing work on initial phases, visioning and planning, is an important activity to advance the AMP. This tactical action will focus on the definition of the vision and services/processes to be deployed, which includes the ICM and transit priority technology tactical actions, as well as advanced traffic signal coordination initiatives.

**Recommendation:** CDOT and DRCOG will work with partners to identify two to three pilot corridors to coordinate traffic management center systems and operations. CDOT and DRCOG will lead visioning and planning of TMC coordination to meet the needs of these corridors and the subsequent deployment, including the transit priority and ICM tactical actions. This pilot step will offer insights into the necessary process improvements required to better coordinate data and traffic operations.

**Other Considerations:** TMC coordination/integration relies on data sharing between jurisdictions and agencies to coordinate regional operations. Additionally, multiple technologies and systems are deployed in the region, which challenges intersystem compatibility and coordination. Finally, the capability and capacity of local jurisdictions and agencies vary across the region.

**Common vision and processes to coordinate dynamic operations between partners are required.**

**CDOT has a concept of operations to coordinate multiple CDOT TMCs.**

**This tactical action must account for other TMC coordination initiatives in the region.**

**Regional coordination visioning and planning must account for the wide variety of capability and capacity of regional partners.**

## Proposed Planning Process: Coordinate Traffic Management Center Systems and Operations



*Additional details on the proposed activities are documented in the matrix.<sup>10</sup> Details include specific activities, proposed lead agencies, notes on existing work plans and potential resource needs.*

<sup>10</sup> <https://drive.google.com/file/d/1VxcuXk69dcJ9KV-NGTIsRe2FzwVa3dEE/view?usp=sharing>

## Recommended Next Steps

In addition to the recommendations below, the AMP will continue to serve as a forum for discussion and coordination on transportation technology efforts in the Denver region, including activities such as: coordinating with stakeholders on related projects, soliciting input from a diverse group of transportation technology-related stakeholders, engaging partners to collaborate on plan and policy development, identifying funding opportunities/coordinating applications, sharing pilot briefings/evaluations, providing informational briefings and facilitating transportation technology-related discussions.

After thorough consideration and discussion of the priority tactical actions, the AMP Working Group surveyed stakeholders (both via a survey that was completed outside of the meeting and broadly distributed, as well as in the AMP Working Group August meeting) to learn about priorities and recommendations. Partner agency staff considered this input as they developed these recommendations. Partner agencies considered existing agency work plans, resource needs, and potential risks/opportunities. The recommendations below are specific next steps and activities pertaining to the implementation of Mobility Choice Blueprint priority tactical actions.

### Data and Data Sharing

#### [Establish a regional mobility data platform.](#)

- CDOT and DRCOG will work collaboratively on this tactical action with CDOT taking lead in Discovery and DRCOG taking lead in Planning/Visioning. Work in these phases will inform future resource requests and platform development/ownership.
  - Lead Agencies: CDOT (Phase 1) and DRCOG (Phase 2)

### Shared Mobility

#### [Develop a universal mobility app for trip planning and payment.](#)

- RTD will monitor opportunities related to development of a universal mobility app for trip planning and payment and consider pursuing initial phases if funding and/or staff resources become available. No initial activities beyond monitoring are proposed at this time.
  - Lead Agency: RTD (monitoring)

### [Implement curbside management standards.](#)

- AMP partner agencies will coordinate with member governments, such as Denver and Boulder, to understand past and current work in this area, as next steps are identified. AMP Working Group will host discovery-focused presentations to learn more about existing local agency work and determine next steps.
  - Lead Agency: AMP Working Group (host discovery presentations and discussion)

### [Pilot neighborhood-scale mobility hubs.](#)

- RTD and CDOT will work collaboratively on this tactical action with significant input coming from local member governments and private operators.
  - Lead Agencies: RTD and CDOT

## **System Operations**

### [Implement transit priority on all major bus corridors.](#)

- Monitor current and on-going transit priority project implementations to confirm measures of success and standardize TSP technology and techniques.
  - Lead Agencies: RTD (monitoring) and CDOT/DRCOG (measures of success and standards)

### [Implement smart traffic signal control technology on major regional arterial corridors.](#)

- Inventory (1) existing infrastructure and systems, (2) management processes, and (3) capacity and capability of jurisdictions and agencies to execute the TMC coordination processes.
- Lead definition of signal control technology standards that support TMC coordination visioning and planning.
  - Lead Agencies: DRCOG and CDOT

### [Pilot integrated corridor management on ten arterial corridors.](#)

- Host Integrated Corridor Management workshop.
- Develop regional vision and concept of operations.
  - Lead Agency: DRCOG

### [Coordinate traffic management center systems and operations.](#)

- Identify key corridors to pilot traffic management center (TMC) systems and operations.
- Lead development of TMC coordination operations vision and philosophies based on pilot corridors.
- Develop an implementation roadmap to deploy and evaluate the pilots.
  - Lead Agencies: CDOT and DRCOG

# Thank you to all of the Steering Committee members!

Allison Conwell, COPIRG  
Alvin Stamp, CDOT  
Amy Ford, ITS America  
Ashley Nysten, CDOT  
Ashley Summers, DRCOG  
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Emily Silverman, Parsons  
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