

QUICK START SUMMARY TO:

Dynamic Curbside Management

Keeping Pace with New Mobility and Technology in the Public Right of Way for Practitioners at Cities, Towns, Metropolitan Planning Organizations (MPO), and State Departments of Transportation (DOT)

This Quick Start Summary provides practitioners with:

- An overview of dynamic curbside management
- Key findings from case studies and interviews with industry experts
- Program frameworks, implementation tools, and future considerations for bringing dynamic curbside management to your jurisdiction

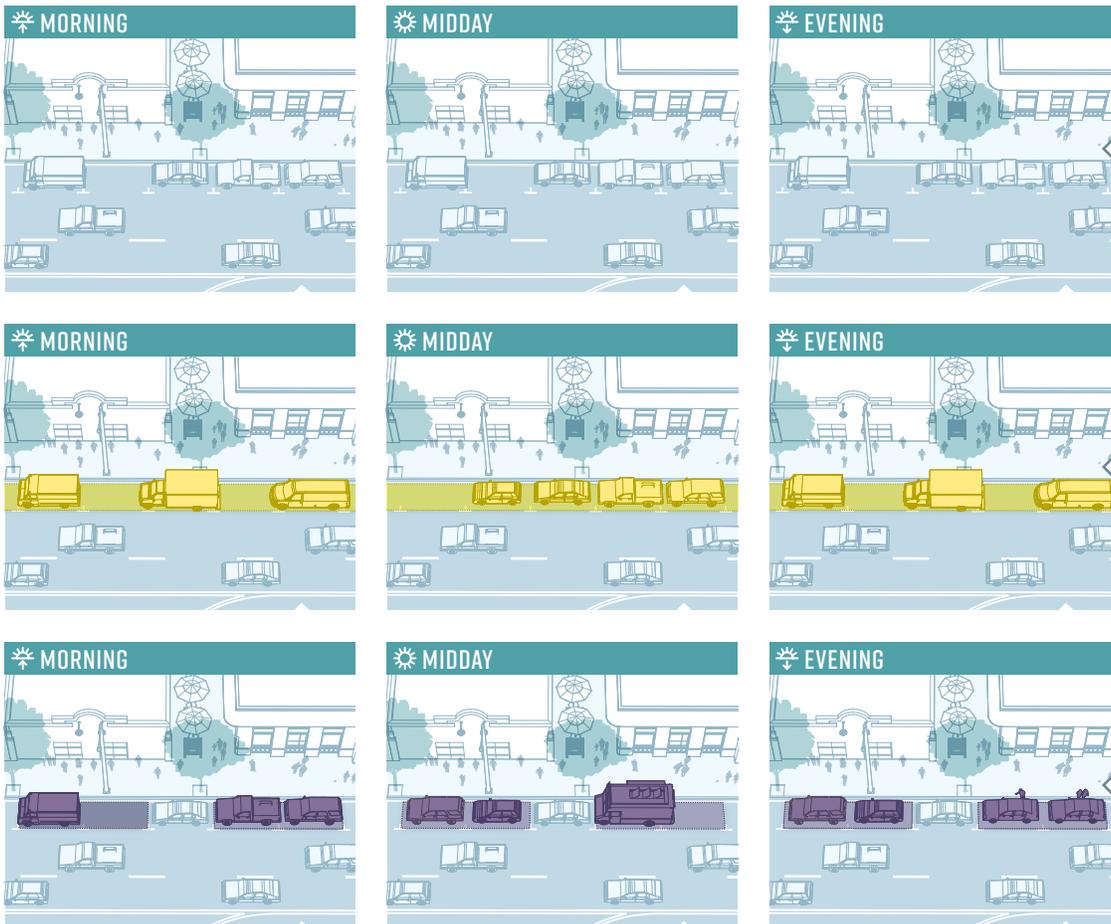
As part of NCHRP 20-102(26), this Quick Start Summary is a companion to the Dynamic Curbside Management Guide.

For more information about the project, visit:
<https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4868>

WHAT IS DYNAMIC CURBSIDE MANAGEMENT?

Dynamic curbside management is the data-driven understanding, allocation, and operation of the curb across space and time to optimally serve curb uses and users as determined by community values.

Dynamic curbside management is an advanced form of curbside management with unique characteristics.

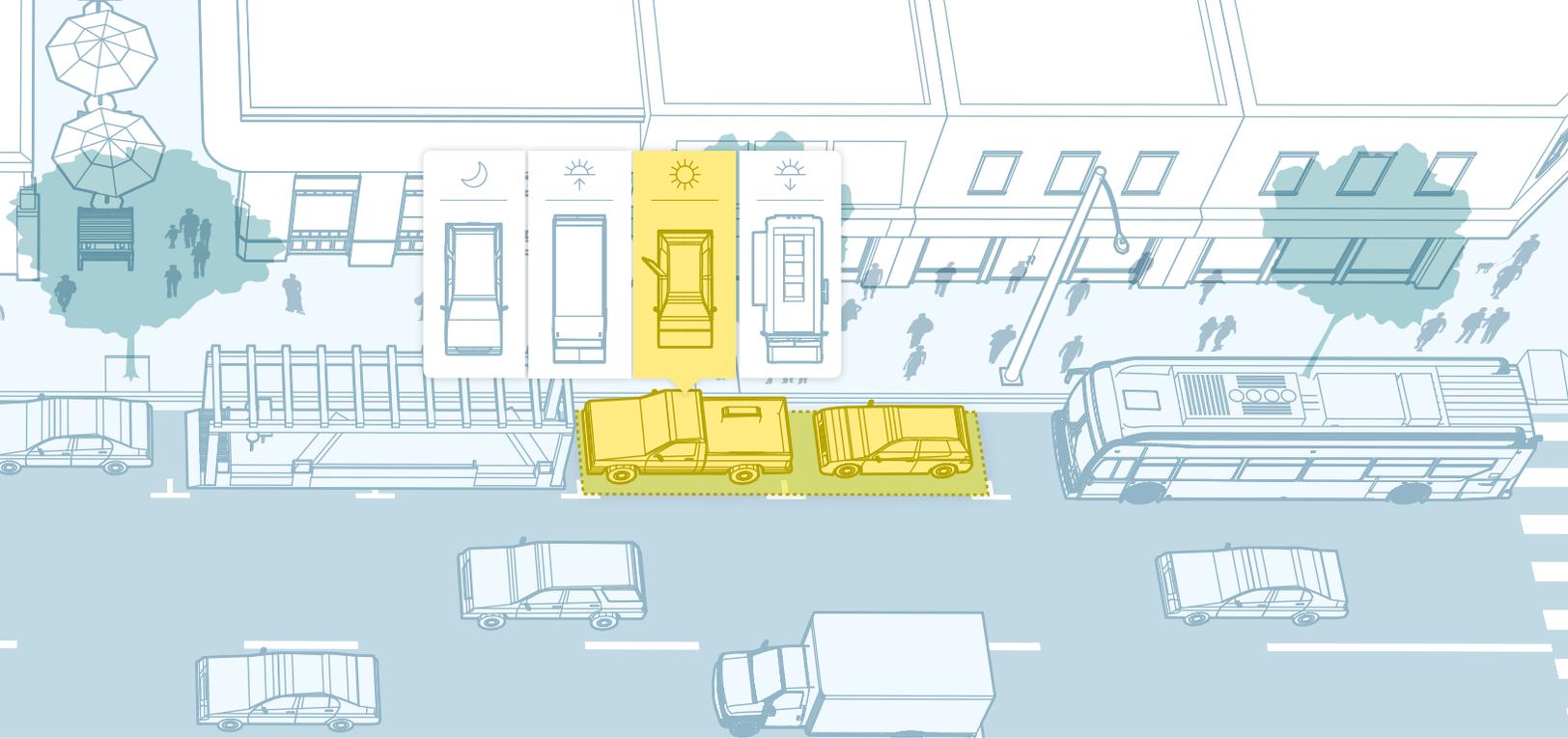


Dynamic elements in graphics below:

Single-use curbside management is the designated use of the curb for one purpose, such as continuous on-street parking.

Flexible-use curbside management uses curb space for multiple purposes over time, like commercial loading in the morning and evening, and on-street parking midday.

Real-time curbside management uses dynamic data and technology to proactively manage curb uses.



Dynamic curbside management supports state DOT and MPO goals.

An optimized curb at the local level aligns with regional and state goals related to congestion reduction, air quality improvement, economic development, safety, equity, accessibility, travel time reliability, and freight movement efficiency.

State DOTs and MPOs can support dynamic curbside management.

Dynamic curbside management is typically managed at the local level, but state DOTs and MPOs play a crucial role. Collaboration and expertise from state DOTs and MPOs with local jurisdictions can make the difference between a successful or unsuccessful dynamic curbside management program. state DOTs and MPOs can support the tasks below:



Create funding opportunities, policy and operational flexibility, and aggregate procurement



Clarify how dynamic curbside management can further State DOT and MPO goals



Develop flexible guidance or frameworks



Serve as a resource for best practices



Build collaborative partnerships and open communication



Provide technical expertise and training



Facilitate data management and data access to cities and the public

NCHRP 20-102 (26) combines several research methods:



Literature review



Policy scan



Virtual Unconference



Case studies

This Quick Start Summary presents key findings from the Case Studies and Unconference.

The Unconference virtually gathered experts from the public and private sectors to convene on the topic and crowdsource knowledge. The case studies captured dynamic curbside management programs across four states, California, Colorado, Florida, and Ohio, with interviews from representatives at the local, regional, and state levels. The case studies revealed how various levels of governmental within one state collaborate on dynamic curbside management. Full case study and Unconference summary details are included in the NCHRP 20-102(26) report.

The Dynamic Curbside Management Guide is the larger companion document to the Quick Start Summary. The Guide includes four sections: Why Dynamic Curbside Management, A Dynamic Curbside Management Program Framework, Dynamic Curbside Management Tools, and Evolving Dynamic Curbside Management Opportunities.

Key findings from the case studies and Unconference are included on the following pages.

CASE STUDY LOCATIONS



KEY FINDINGS: WHY DYNAMIC CURBSIDE MANAGEMENT?

Case study interviews and the Unconference takeaways regarding the fundamental elements of dynamic curbside management

Curb elements include infrastructure, functions, users, and characteristics.

- Areas such as central business districts, high density residential and mixed-uses, entertainment zones, and delivery hubs are driving the emerging need for dynamic curbside management.
- The focus has shifted to encompass urban freight and flexible curb uses.

Understanding and addressing stakeholder concerns impacts program success.

- Equitable and authentic engagement is necessary to identify needs, discuss competing interests, and consider tradeoffs when making curb space use decisions.
- Clear performance measures and outreach metrics to evaluate success should also be communicated with stakeholders throughout curbside management efforts, with direct connection to community values.

Dynamic curbside management supports broader transportation goals.

- Dynamic curbside management goals can be connected to existing organizational goals around safety, sustainability, congestion, vehicle miles traveled (VMT) reduction, or other regional and state level goals.
- Agencies can lean on synergies of Complete Street policies and dynamic curbside management.
- Statewide initiatives about freight movement are an opportunity for more explicit dynamic curbside management collaborations between state DOTs, MPOs, and local jurisdictions.

LEARNING FROM FLORIDA

The Florida case study demonstrated how dynamic curbside management can support broader goals. In Florida, opportunities exist to connect Florida DOT's Complete Streets policy with local dynamic curbside management. **Amending Complete Street policy language has the potential to better accommodate dynamic curbside management and help prioritize modes on streets across the state.** A dynamic curbside management framework can help Complete Streets planning, as not all modes can be accommodated on all streets.

KEY FINDINGS: DYNAMIC CURBSIDE MANAGEMENT PROGRAM FRAMEWORK

Case study interviews and the Unconference takeaways for using a dynamic curbside management approach, creating a framework, and implementing a program

Frameworks establish curb goals and priorities through context, use, space, and time.

- Only one local jurisdiction from the case studies has used a framework, and others experienced challenges without a framework.
- Jurisdictions are often looking to peer localities for guidance on fee structure.
- Context, use, space, and time are the four key dimensions to understanding and managing the curb.

Curb performance metrics help track program success.

- Key metrics typically include occupancy, dwell time, instances of blocked crosswalks/intersections, and instances of double parking, which is a direct measure of demand outstripping supply and an indirect measure of safety.
- Heavy curb users from the private sector track metrics, and their goals can conflict with agencies' goals. For example, a pick-up/drop-off geofenced area could be a success for the local jurisdiction due to less double parking or congestion, but from the ridesourcing company, the geofenced area could result in less efficient pick-up where riders and drivers have trouble locating each other, must call each other, rate each other poorly, and cancel more rides as a result.

LEARNING FROM COLORADO

The Colorado case study highlighted the power of performance measurement and pricing approach in dynamic curbside management. **Double parking was a performance indicator** used in the Aspen dynamic curb pilot examined as part of the case study, which saw a decline in double parking and blocking of crosswalks and intersections during the dynamic curbside management pilot project. In Denver and Aspen, case study interviewees emphasized the **importance of pricing as a dynamic curbside management approach and the ability for the price to change** without repeated returns to Council.

Develop effective partnerships.

- Public and private sector stakeholders emphasized the importance of early involvement on both sides and having clear expectations. Barriers frequently come up on the procurement, policy, and legal sides. Success has been found with cities that have good legal team that is involved early, and work creatively to “find a way to yes.”
- Flexibility on pilot structure is critical as many uncertainties can arise in dynamic curbside management pilots.
- Regular communication and cross-agency working groups are also beneficial to effective partnerships.
- A lack of alignment between city departments, as well as different levels of government, poses serious challenges.

Consider contracting or in-house capacity building.

- Create opportunities for state DOT and MPO staff to assist local jurisdictions with dynamic curbside management projects and programs.
- State DOTs and MPOs may provide technical assistance, trainings, aggregated skills, data management, and peer exchanges, and they may also assist in policy development.

KEY FINDINGS: DYNAMIC CURBSIDE MANAGEMENT TOOLS

Case study interviews and the Unconference takeaways for understanding dynamic curbside management tools, data needs, and political barriers

Physical infrastructure is still developing.

- Local jurisdictions who use sensors to manage the curb report mixed results, as payment data might be a good enough proxy, some sensors could not provide enough data granularity, and in-ground sensors were easily dislodged and had to be repeatedly glued back into place.
- Camera detection is an option, but needs power from an existing light pole, and can have line-of-sight issues.
- Cities that are at the leading edge of dynamic curbside management are still working on limiting physical infrastructure such as individual parking meters.

App-based tools were the most used digital technology.

- Many dynamic curbside management pilot projects rely on mobile devices to reserve and pay for a loading zone, which creates equity implications for those without smart phones and has third-party system integration limitations.
- Public distrust and analysis needs of Artificial Intelligence (AI) approaches are barriers.
- Curb infrastructure mapping pilots are staff and time intensive, and local jurisdictions may not use the data afterward.
- None of the interviewees use automated enforcement, but referenced the potential benefit of it, while Unconference participants felt automated enforcement had limitations in the near-term.

LEARNING FROM CALIFORNIA

The California case study demonstrated the complexities of data collection and using technology in dynamic curbside management. In Santa Monica pilot projects, some of which were funded by the Southern California Association of Governments (SCAG), **data collection by staff was time intensive or difficult to acquire** from ridesourcing partners. The use of **video cameras had line-of-sight limitations**, and **public distrust of AI technology** has been a barrier.

Data requirements, management and governance, and data sharing and privacy should be considered.

- Jurisdictions have varying levels of readiness for dynamic curbside management, as most cities currently have little or no curbside management, let alone the ability to do dynamic curbside management.
- Data acquisitions is a challenge, and a major barrier is the inability to access primary data from ridesourcing companies. A heavy reliance on staff to collect data in-person exists, which is expensive.
- MPOs acting as a data clearinghouse/manager and assisting local jurisdictions with analysis has seen some interest and activity.
- No easy method exists to efficiently digitize curb assets, but a piecemeal approach is promising.
- The Open Mobility Foundation (OMF) is working to develop an open source and standardized curb data specification (CDS), and the current focus of CDS is on commercial uses. MPOs have expressed some interest, but state DOTs could play a larger role.

Political and policy barriers exist and can be overcome.



- Changes at the curb are highly political and require very strategic, technically adept staff to successfully clear the many barriers—from state DOTs, from other departments, from council, from the public—that may present themselves. Crafting a narrative of benefits resonates with city leadership and the public.
- Organizational culture of DOTs can be a barrier for local jurisdictions. DOTs are focused on facilities they control and may be hesitant to get involved with local issues. Additionally, staff from some local jurisdictions said they largely avoided doing dynamic curbside pilots that would involve a state DOT managed facility due to real and perceived barriers.
- District offices at the state DOT level are critical as they are most likely to hear when local curb issues surface, particularly on state highways.

KEY FINDINGS: EVOLVING DYNAMIC CURBSIDE MANAGEMENT OPPORTUNITIES

Case study interviews and the Unconference takeaways for considering emerging mobility and delivery options, and equitable access to the curb as a public space

Consider the integration of autonomous, connected, electric, and shared vehicles (ACES).

- State DOTs are currently supporting research and funding toward the intersection of ACES and future curbside management, such as piloting Smart Corridors with connected infrastructure.
- MPOs can begin incorporating ACES into regional transportation models.
- ACES technology supports Safe Vehicles, which is one of the five elements of a Safe System approach to transportation safety. This approach aims to eliminate fatal and serious injuries for all road users by anticipating human mistakes and keeping crash forces on the human body at tolerable levels.
- ACES technology also creates opportunities to change land use patterns to support denser development and mixed uses.

Urban freight delivery is experiencing innovations.

- Growth in e-commerce and just-in time demands, as well as observed challenges related to parking and congestion are leading interests in dynamic curbside management.
- Experimenting with sidewalk delivery drones has the potential to reduce trips and vehicle miles traveled, but limited data has not provided conclusions at this time.
- Continued freight innovation and research supports the importance of separating vulnerable road uses in space and time from heavy vehicles.

Micromobility is continuing to evolve.

- Micro-mobility is the term used to describe small vehicles such as electric or human powered shared scooters, bicycle and mopeds, often used for short-distance trips
- The evolution in micro-mobility is helping spur conversations about data standardization and data management, which is important for dynamic curbside management.

Strive to facilitate and maintain equitable access.

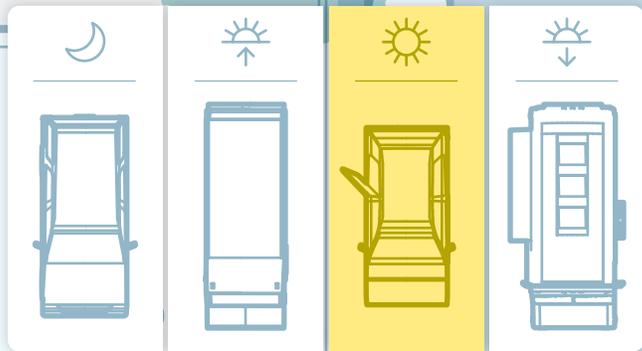
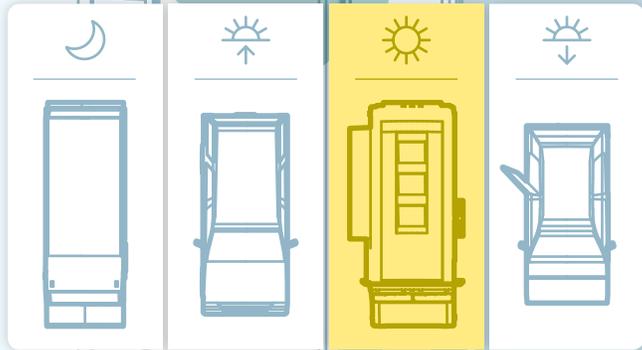
- Changes to curbside uses, access, and pricing may have disproportionate impacts on those who depend on certain transportation modes and have few modal options.
- Consideration should be given to equity implications of all curbside management decisions.
- Knowledge of community concerns and goals is essential to determine which uses of the curb optimize that space in an equitable way.

The curb is being seen as an extension of the public realm.

- In response to the COVID-19 pandemic, curb space previously designated for on-street parking was reallocated and repurposed for other uses such as restaurant and retail pickup, outdoor dining, and even COVID-19 testing—dynamically using curbs that previously served one purpose. This has shifted the mindset of many stakeholders and even the public about the potential for the curb beyond automobile travel and on-street parking.

LEARNING FROM OHIO

The Ohio case study demonstrated how a culture of innovation and structure to implement change can support dynamic curbside management. The City of Columbus was awarded a USDOT Smart City Challenge grant, which led to **support from leadership and an emphasis on innovation and risk-taking** in dynamic curbside management testing. In collaboration with the Mid-Ohio Regional Planning Commission (MORPC), the project focuses on curb lane management to support urban goods movement. **Adapting an innovative culture has allowed Columbus to experiment with technologies and testing dynamic curbside management approaches and tools**, such as an enhanced parking app using in-ground sensors, a loading zone pilot project, and camera detection technology. Based on learnings from this work, Columbus has implemented demand-based pricing.



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