

Curb Management Regional Planning Guide

March 31, 2020

Prepared for: North Central Texas Council of Governments



**North Central Texas
Council of Governments**

Contents

Executive Summary	1
What is Curb Management?	1
Why is Curb Management Important?	1
Your Community Can Implement Curb Management	3
Introduction and Background	6
What is Curb Management?	8
Demands for the Curb are Changing	8
Functions of the Right-of-Way	12
Additional Curb Management Resources	13
ITE Curbside Management Practitioners Guide	13
NACTO's <i>Curb Appeal</i>	13
The Shared-Use City: Managing the Curb	14
Curb Management Tools	16
Transit	16
Transit Only Lanes	16
Queue Jumps	17
Bus Bulbs	17
Right-Turn Pockets	18
Automated Enforcement	18
Loading/Unloading Zones	19
Transportation Network Companies	19
Deliveries	19
In the Future: Autonomous Vehicles	20
Pedestrian	21
Curb Extensions	21
Widening Sidewalks	22
Parklets	24
Bicycle	25
Protected Bikeways	25
Shared, Motorized Mobility Options	26
Parking	29
Demand-Based Pricing	29
Time Limited Parking	29
Off-Street Parking	29
Residential/Neighborhood Parking Permits	30
Flexible Curb Lanes	30
Parking Benefit/Management Districts	30
Curb Management Planning Guide	32
When do you Need Curb Management?	32
Community Checklist	34
Curb Management Planning	36
1. Where are the Major Activity Centers?	36
2. Develop Purpose and Assign Priorities	38
3. Information Gathering and Existing Conditions	41
4. Evaluate the Data and Make a Determination	43
Selecting Alternatives	48
Static & Flexible Curb Management	48

Options Analysis for Modes not Prioritized	51
Education and Outreach	52
Technology	54
Conclusion and Next Steps	57

Figures & Tables

Figure 1: NCTCOG Region and Boundaries.....	6
Figure 2: Access to the Curb by User Group	10
Figure 3: Person Throughput per Hour by Mode.....	11
Figure 4: Bus Only Lane Example	16
Figure 5: Queue Jump Example	17
Figure 6: Bus Bulb Example	17
Figure 7: Right Turn Pocket Design Example.....	18
Figure 8: Example of Loading Zone Time Limits.....	20
Figure 9: Curb Extension Example	22
Figure 10: Wide Sidewalk Example	23
Figure 11: Parklet Example.....	24
Figure 12: Protected Bikeway Example	26
Figure 13: Examples of Shared Mobility Parking.....	27
Figure 14: Designated Ride Area Example	28
Figure 15: Time Limited Parking Example	29
Figure 16: Curb Management Scale	33
Figure 17: Land Uses Most Suited for Curb Management	37
Figure 18: Prioritization Considerations	38
Figure 19: Questions to Consider in Determining Curb Access Prioritization	39
Figure 20: Information Gathering Considerations	42
Figure 21: City of Seattle Right-of-Way Allocation Decision Framework	44
Figure 22: Flexible Curb Example.....	50
Figure 23: Example of Protected Bike Lane Pilot	52
Figure 24: Park Mobile Registration Instructions.....	55
Figure 25: Curb Management Tiers.....	54
Table 1: Sample Prioritization Matrix	40
Table 2: Benefits and Trade-offs of Curb Management Treatments.....	46
Table 3: Curb Management Tiers--Recommended Priorities.....	56

Executive Summary

In recent years, Curb Management has become more than a buzzword—it is now an essential planning function for cities and towns of all sizes and contexts. In keeping with its role as the Metropolitan Planning Organization in North Central Texas, the North Central Texas Council of Governments (NCTCOG) had developed this Curb Management Regional Planning Guide for use by communities throughout the region and beyond.

What is Curb Management?

Curb management is any intentional practice to bring order to the curb and determine specific priorities for space. It refers to a broad and varied suite of tools and treatments. It can range from simple signage or striping distinguishing the public right-of-way from private property; to permanent changes to curb infrastructure like bus bulbs, queue jumps, or protected bike lanes; to computer-generated geofencing to designate pick-up and drop-off areas for Transportation Network Companies like Uber and Lyft. The physical manifestations of curb management are dependent upon the size, context, and priorities of the community.

Why is Curb Management Important?

A lack of curb management can result in negative consequences that impact the daily lives of a community's constituents. These include, but are not limited to, competing and conflicting demands for the curb space, congestion and a low level of service for all transportation modes, accessibility and safety issues, difficulty accessing the curb for public services and improvements, and an inability to effectively accommodate new and ever-changing transportation modes.

With active and intentional curb management, communities can make access more equitable among different modes of travel, improve level of service for all modes of travel, collect data on transportation behaviors, and eventually monetize the curb when it's a priority. The following images show a full-scale integration of active curb management, with space clearly designated for each transportation mode. While these images are set in an urban environment where many transportation modes are present, this approach can be adjusted to fit a more tempered setting where individual components of the approach—such as a dedicated bike lane, or a pick-up and drop-off area—can be applied. This is discussed further on pages 32-35 of this report.



In these images, buses travel in a dedicated bus lane, thereby reducing conflicts with vehicles in the travel lane. There are also dedicated areas for taxi (yellow), ADA parking (blue), pick-up and drop-off (purple), as well as a community gathering area.



In this image, additional on-street areas for commercial loading and unloading, bike crossing through intersections, and storage for micro-mobility vehicles like scooters and bikes are shown.




Your Community Can Implement Curb Management

There are many different treatments and solutions to issues that arise at the curb. Determining an appropriate solution and implementing that solution requires a multi-step process.

- **Where in Our Community Does Curb Management Make Sense?** Curb management is best implemented in areas where different and competing activities occur. This might include a commercial area, a central business district, or a mixed-use retail and restaurant corridor.
- **What Modes and Activities Should be Prioritized, and Where?** Communities should first look to their comprehensive planning documents—such as a Transportation Master Plan—to broadly identify goals and priorities. For example, a Master Plan may push for accommodation of active modes of travel, like pedestrian and bike usage, or may emphasize better levels of service on the city’s transit system. In addition, communities should identify areas of the community where certain modes should be prioritized over others. For example, in a central retail district with extensive commercial activity, access for business usage—like commercial loading and unloading—might be prioritized.
- **What Does the Data Tell Us?** Communities should then conduct both quantitative and qualitative data collection to assess the needs within the identified area of focus. For example, communities might conduct intercept surveys to identify user challenges, and may collect on-the-ground counts of bus and transit activity, Uber and Lyft activity, and commercial loading activity.
- **What are the Tradeoffs?** Tradeoffs should be evaluated in keeping with the modal priorities the community has set. For example, installation of a protected bike lane might impede speed of movement in the travelway among motorists, but if active modes have been prioritized in the focus area, this might be an appropriate and necessary tradeoff. Conversely, a commercial loading zone would increase ease of this business activity, but may pose a challenge if parking revenues are an essential priority and no revenue is generated from loading zone usage.

- **How do we Know This Treatment Works Well?** Finally, communities who have selected and implemented treatments should continue to monitor their success in accordance with the issues identified and priorities set. This evaluation should include quantitative data collection (such as with on-the-ground counts or video data collection), as well as qualitative data collection through surveys and public outreach.



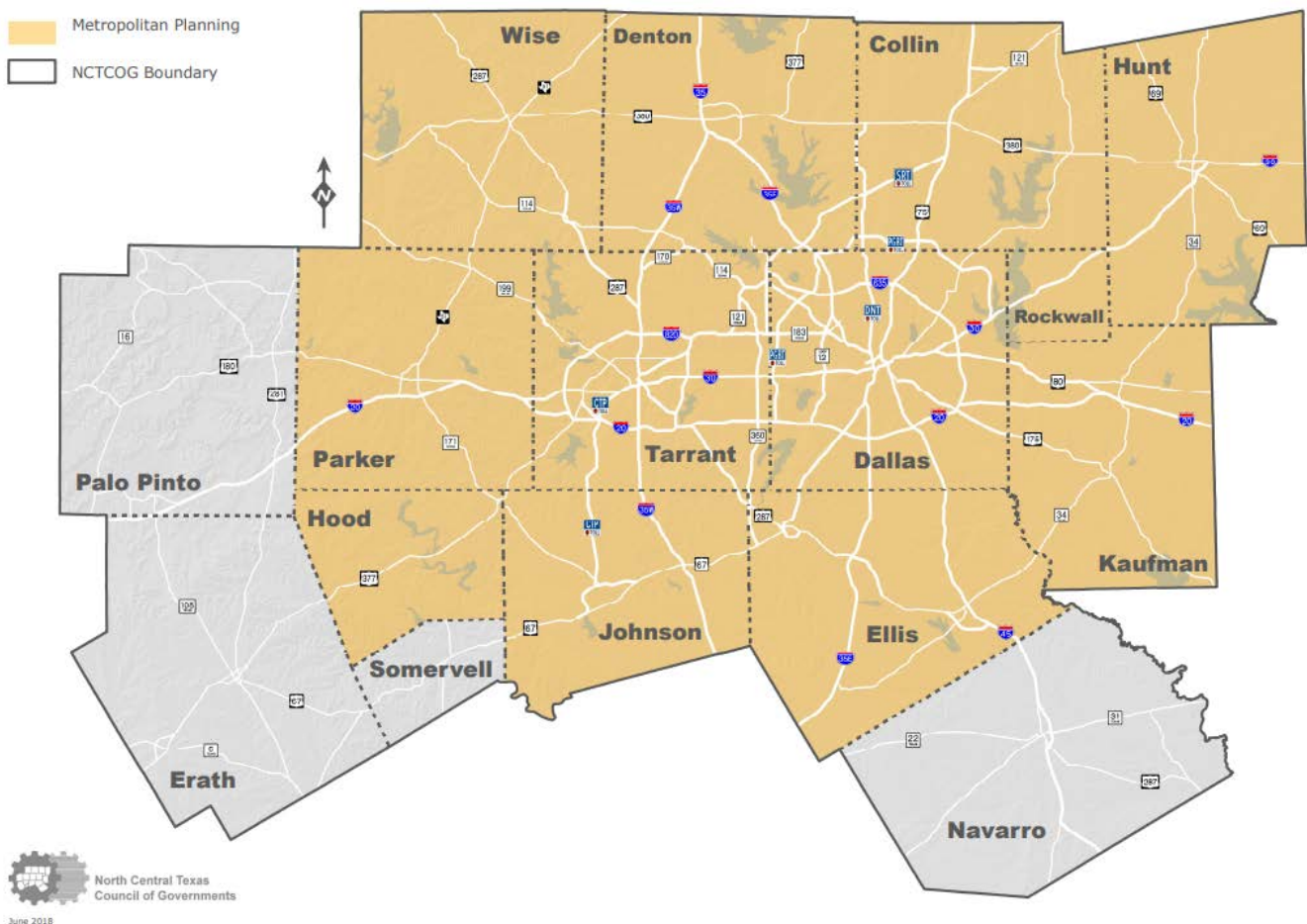
01 Introduction & Background

Introduction and Background

The North Central Texas Council of Governments (NCTCOG) is a voluntary association of, by and for local governments, established to assist in regional planning. The NCTCOG serves as the Metropolitan Planning Organization (MPO) for the 12-county Dallas-Fort Worth region. As an MPO, NCTCOG works in partnership with regional, state, and federal partners to plan and recommend transportation projects that will improve mobility and encourage more efficient land use, while minimizing impacts on the region's air quality.

The NCTCOG encompasses several communities within North Central Texas. Boundaries of the NCTCOG planning area are shown in Figure 1.

Figure 1: NCTCOG Region and Boundaries



Source: *NCTCOG.org*, 2018

NCTCOG communities' range in size from major cities such as Dallas and Fort Worth, to mid-size cities such as Arlington, Plano, McKinney and Richardson; as well as the historic communities of Decatur and Wylie. Overall, the NCTCOG planning areas encompasses 9,448 square miles, 12 counties, and 225 cities, towns, and villages. It is the fourth largest metropolitan area in the U.S.

NCTCOG is responsible for broad mobility goal-setting for the entire region, including development of regularly-issued Metropolitan Transportation Plans. The most recent Plan was issued on June 14, 2018, titled *Mobility 2045*. Generally, the plan discusses methods to achieve transportation choice, wherein everyone has a low-cost, reliable option, and road congestion is reduced. Solutions offered by the plan generally include expanded and improved transit and bicycle/pedestrian facilities, roadways designed with multiple forms of transportation in mind, and context-sensitive design approaches. In addition, the Plan encourages the use of federal, state, and local funding for transportation infrastructure and amenities.

With a priority in providing travel options, communities within NCTCOG can begin to envision a multi-modal transportation system at the curb, aligning with the goals established in *Mobility 2045*. It is at the curb that people access bike lanes, catch their bus, get picked up, and park their car. In order to ensure that varying modes and activities can access throughout and at the curb in a safe and orderly fashion, communities should consider implementing curb management policies and strategies.

Curb management provides systems that designate space or assign rules and policies that assist in providing varying user groups safe and easy access to the street. Finally, curb management enables eventual monetization of the curb through appropriate paid strategies for certain user types in order to cover related operations, maintenance, and program costs. With the pace of technology advancement in the transportation world, it is especially important to actively plan for existing and new transportation modes—from developing data collection practices, to creating regulations governing the use of micro-mobility options, to physically organizing portions of the curb itself. Furthermore, curb management can also help communities achieve broader mobility and sustainability goals, such as reducing vehicle congestion or improving air quality.

NCTCOG has partnered with Walker Consultants (Walker) to provide a regional planning guide for curb management. This guide contains an overview of curb management best practices from the guiding documents currently available as well as a detailed guide on how and when to implement curb management policies and strategies.

How to Use This Guide

The purpose of this guide is to aid communities in the Dallas-Fort Worth region with determining when, where, and how to implement curb management strategies, options that are available, and factors to consider. The guide is divided into three key sections:

1. **Introduction and Background:** An introduction to the topic of curb management and why it has become an important planning topic for cities and towns. This section also includes a series of resources available outside of this Guide.
2. **Curb Management Tools:** Tools and treatments of varying degrees of complexity, arranged by transportation type.
3. **Implementing Curb Management:** Guidelines for when, where, and how to implement curb management in your community, with best practice examples from other communities.

What is Curb Management?

The curb is a complex, shared environment, often defined by its mix of competing uses, roles in access and mobility, and provision of space for social gathering, commerce, and pickup/drop-off activities. The term “curb management” is a catch-all term that references the intentional act of defining the use, designation, and organization of curb space.

“Curb management” brings order to a complex, shared place with competing uses.

While the phrase “curb management” has become more commonplace in recent years, implementation of a managed curb has always occurred in the form of on-street parking geared toward single occupancy vehicles (SOVs).

Now that shared mobility and technology have changed how people can and want to travel beyond the car, parking demand can be shifted in some areas to facilitate more shared and active transportation trips. As a result, the humble curb is now the place to be with competing uses between Transportation Network Companies (such as Uber and Lyft), bicycles, scooters, transit, delivery vehicles, and private cars. Given these demands, non-existent or limited curb management can result in congestion, and create accessibility and safety issues.

Therefore, the complexity of managing the competing needs of the curb is evolving to handle the dramatic increase in demands from these users, increase mobility and access, bring order, and promote safety. Even places that are not currently experiencing major changes as a result of these shifts need to anticipate the growing demand to come. This is why implementing plans and policies that accommodate current mobility trends and can adapt to foreseeable changes in the industry is of increasing importance.

Demands for the Curb are Changing

While historically, single occupancy vehicles (SOV) were the primary mode of transportation to dominate on the street and at the curb, in many places, the curb has become a hub for a variety of modes and services.

Pickup/Drop-off at the Curb

Most notably is the influx of **Transportation Network Companies (TNC)** such as Uber and Lyft. TNCs are most prominent in urban areas and bigger cities, but their use is gradually increasing in small to mid-size cities and suburban communities, providing millions of rides per day across the country.

The increase in **deliveries** due to the rise in ecommerce has put added pressure and demand at the curb. It’s estimated that ecommerce has caused delivery truck traffic to double in the past 10 years¹ due to an increase in shopping via sites like Amazon, and for hire delivery services such as DoorDash, Postmates, and Uber Eats. This has also resulted in an increase in fines due delivery vehicles illegally parking or stopping.

The combination of TNCs and deliveries have significantly increased pickup and drop-off activity at the curb, resulting in more instances of double parking. With an unmanaged curb, TNCs and delivery drivers are required to

¹ Curb Control, *Planning*, June 2019

either utilize a parking space or double park in a travel lane in order to conduct their pickup or drop-off. This has led to congestion and safety issues.

Dockless Vehicles

Electric scooters and bikes have also recently infiltrated city streets. Unlike a typical bikeshare with dedicated stations, dockless vehicles may be parked anywhere and access may be granted to users via a mobile device for a fee. Since dockless vehicles may be parked anywhere, they have the opportunity to provide a quick travel option for short trips across a variety of locations. However, without dedicated space to stage these scooters and bikes, potential conflicts may arise with too many vehicles parked in the sidewalk, impeding or blocking pedestrian travel.

Future Mobility

As Autonomous Vehicles (AVs) are tested and enter the public market, municipalities, state, and federal entities are considering how these vehicles will maneuver and function on existing roadways, and how infrastructure will need to be updated to accommodate them. These types of vehicles will also likely increase pickup/drop-off activity considerably at the curb. Because the impact of autonomous vehicles on the single-occupancy and shared mobility markets is not yet quantifiable, neither is the precise impact of pick-up and drop-off space at the curb. It is reasonable to expect that when and if fully autonomous vehicles become widely accepted, a significant portion of existing on-street parking would be readily convertible into active pick-up and drop-off space.

Pedestrians, Cyclists, and Transit

Along with these newer modes and services, **bicycle, pedestrian, and transit modes** continue to require space, especially as many cities seek to reduce congestion and greenhouse gas emissions generated from private vehicle travel. More cities have begun installing bike share systems, providing enhanced transit stops for bus rapid transit (BRT) and other forms of public transit, and wider sidewalks and pedestrian facilities to encourage transportation options beyond the automobile.

Other Uses

The curb may also be a space for landscaping and street furniture, as well as a social gathering and commercial endeavors such as parklets, food trucks, and street vendors. It's also vital for cities to consider ADA and **accessibility** requirements in combination with providing curb access to these various modes.

Figure 2 provides a graphical illustration of the various user groups seeking space at the curb.

Figure 2: Access to the Curb by User Group

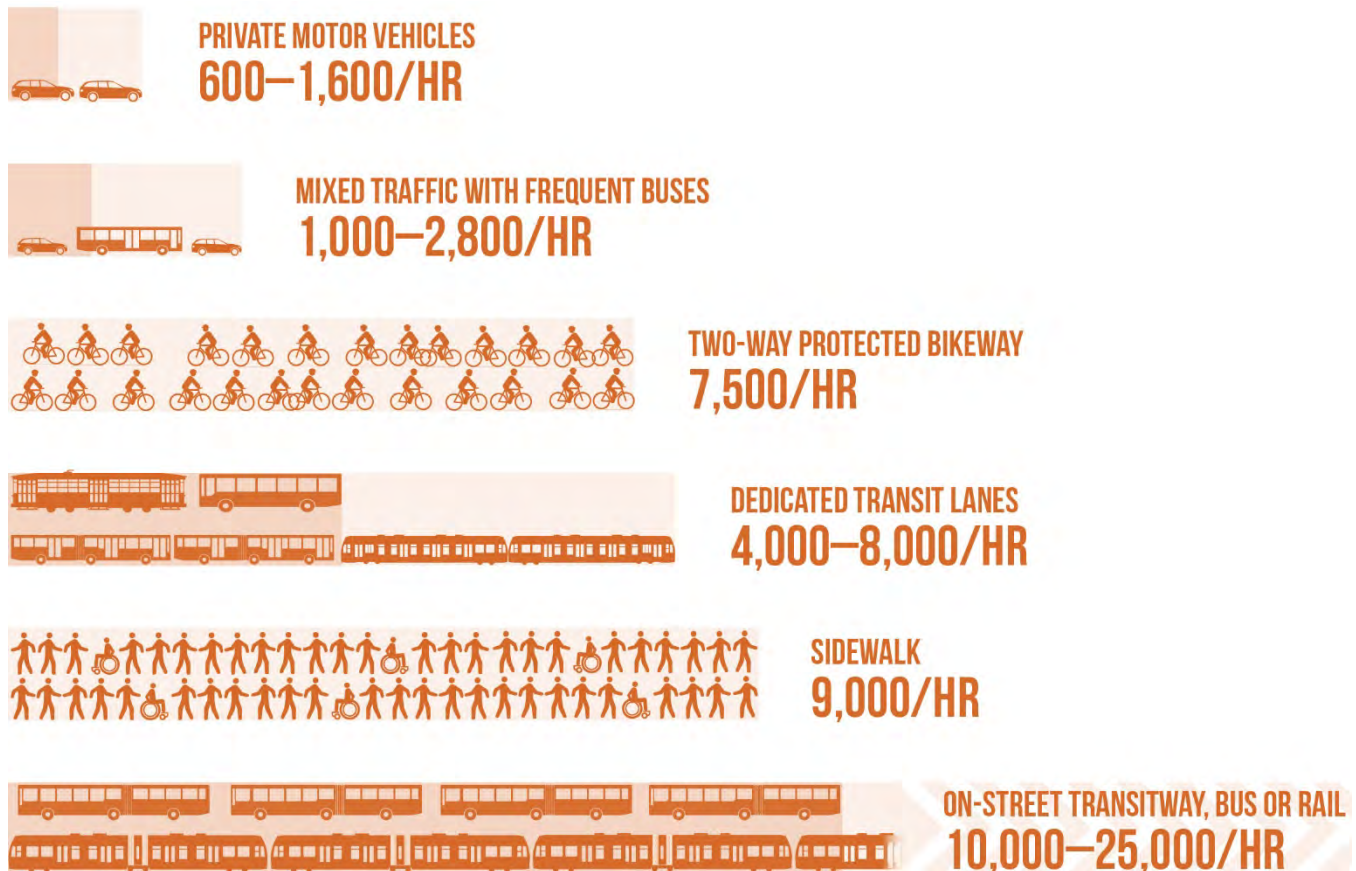


While curb space has primarily served parking, with the increase in user groups and changing needs, it is increasingly important for communities to understand the utilization of their curbs. They can then determine if parking is the best use based on actual activity and demand, or if parking/vehicle storage needs can be shifted to off-street locations. The curb also has potential to provide greater access to more people if options beyond parking are considered.

In general, supporting travel behavior other than driving alone may drastically increase the amount of people that are able to be served on a street. The National Association of Transportation Officials (NACTO) has studied the amount of people that may be served within an hour by mode. In general, providing access beyond single occupancy driving significantly increases person throughput on a street. According to NACTO, shifting trips to more efficient travel modes is essential to upgrading the performance of limited street space.

NACTO provides a graphic illustrating the person throughput, shown in Figure 3.

Figure 3: Person Throughput per Hour by Mode



The capacity of a single 10-foot lane (or equivalent width) by mode at peak conditions with normal operations.

Source: NACTO, *Designing to Move People*, 2013

Implementing curb management strategies can assist in supporting multiple travel options and thereby increase person throughput. While a parking space may be able to serve those who drive, providing space at the curb for walking, biking, and transit modes, increases the person throughput and therefore access on that street segment.

Functions of the Right-of-Way

The right-of-way is a multi-faceted piece of infrastructure, acting as a:

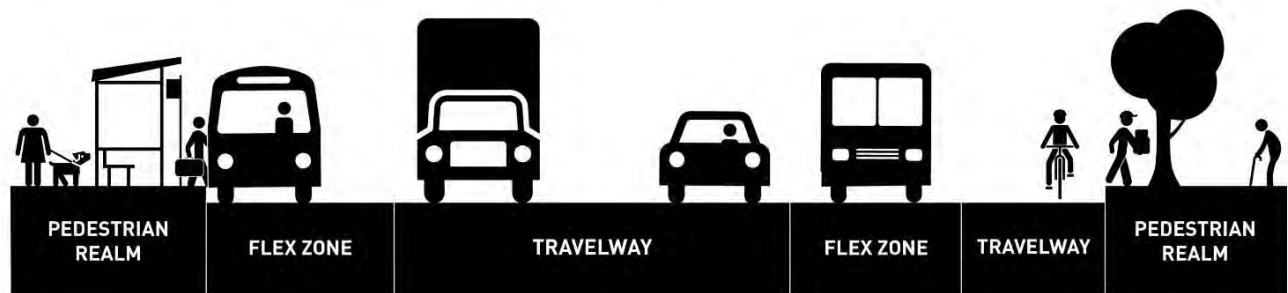
1. **Travelway:** A space where people can move from place to place using various modes of transportation.
2. **Activity Space/Pedestrian Realm:** A space where people gather and socialize outside of vehicles.
3. **Flexible Area:** A transitional space between the travelway and activity space, where business occurs (e.g. deliveries, transit stops, on-street parking, and loading zones).



Figure 4 provides a graphic illustration of these three zones.

Figure 4: Street Right-of-Way Zones

STREET RIGHT-OF-WAY (ROW) ZONES



PEDESTRIAN REALM
Comprised of frontage, pedestrian mobility, and furniture zones between the property line and the flex or travelway zones. This space includes the sidewalk, planting areas, bus shelters, sidewalk cafes, and bike racks.

TRAVELWAY
Most often used for mobility purposes. Lanes can serve all modes or be dedicated to serve specific modes, such as a bus or bike lane.

FLEX ZONE
An essential zone for people and goods, providing separation between moving vehicles in the travelway and people in the pedestrian realm. This zone can contain multiple uses along a street - including commercial deliveries, parklets, on-street parking, and taxi zones. It can be used for mobility at specific times of the day.



Additional Curb Management Resources

With the growing need for curb management guidance for municipalities across the country, multiple resources have been developed to assist cities with creating policy for their curbs.

The primary resources currently available on the practice of curb management are reviewed below. These resources have also informed the plans and recommendation within Section 2, Curb Management Tools, and the Curb Management Guide (Section 3), of this document. These references will be noted in those sections.

ITE Curbside Management Practitioners Guide

The Institute of Transportation Engineers (ITE) developed the Curbside Management Practitioners Guide in 2018. This guide provides best practices for curb space allocation policy and implementation.

The goal of this guide is to provide users the tools and reference material needed to make decisions pertaining to the allocation of curb space. The Guide includes planning and implementation considerations, policy development, prioritization, available tools and treatments, and evaluation metrics.



NACTO's Curb Appeal

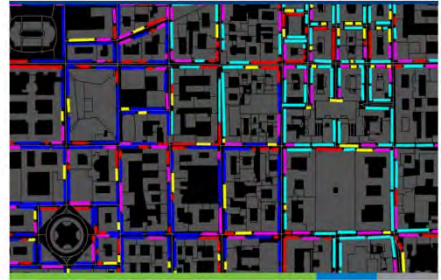


The National Association of City Transportation Officials (NACTO) published the resource paper *Curb Appeal: Curbside Management Strategies for Improving Transit Reliability*, in 2017. This paper provides an overview of curbside strategies that prioritize transit. It provides examples of how cities have successfully changed curb use to support transit.

The Shared-Use City: Managing the Curb

The International Transport Forum (ITF) at OECD is an intergovernmental organization with 59 member countries. It acts as a think tank for transportation policy. In 2017, ITF published a report titled *The Shared-Use City: Managing the Curb*. This report provides an in-depth analysis on how curb use may shift from a focus of on-street parking to more flexible allocation that includes pickup and drop-off zones for passengers and freight.

This study is primarily focused on pickup/drop-off activity for TNCs and freight delivery and provides a detailed overview of available data from cities across the U.S. This report also includes a list of recommendations of how cities can better plan for these activities at the curb.



The Shared-Use City: Managing the Curb



The background of the page is an abstract composition of overlapping geometric shapes in various shades of teal and blue. The shapes are primarily triangles and quadrilaterals, creating a sense of depth and movement. The colors range from a light, airy cyan to a deep, dark navy blue. The overall effect is modern and professional.

02 Curb Management Tools

Curb Management Tools

This section provides an overview of various curb management tools and initiatives that may be considered. The tools provided are separated by the different types of user groups including transit, pickup/drop-off, pedestrian, and bicycle. These tools form a series of treatment options, to be put into use to implement curbside management strategies. Each curbside management scenario requires that a combination of these treatments be used to address the curb's modal priorities and land uses.

Transit

There are several options that can result in increased mobility for transit vehicles by dedicating curb space.

Transit Only Lanes

Transit only lanes provide dedicated travel lanes for buses and light rail/streetcars and increase service reliability by reducing conflicts with other forms of traffic. Lanes can be designated as “transit-only” at all times, or only during peak-periods and become lanes for pickup/drop-off or parking during non-peak-periods.

Figure 4: Bus Only Lane Example

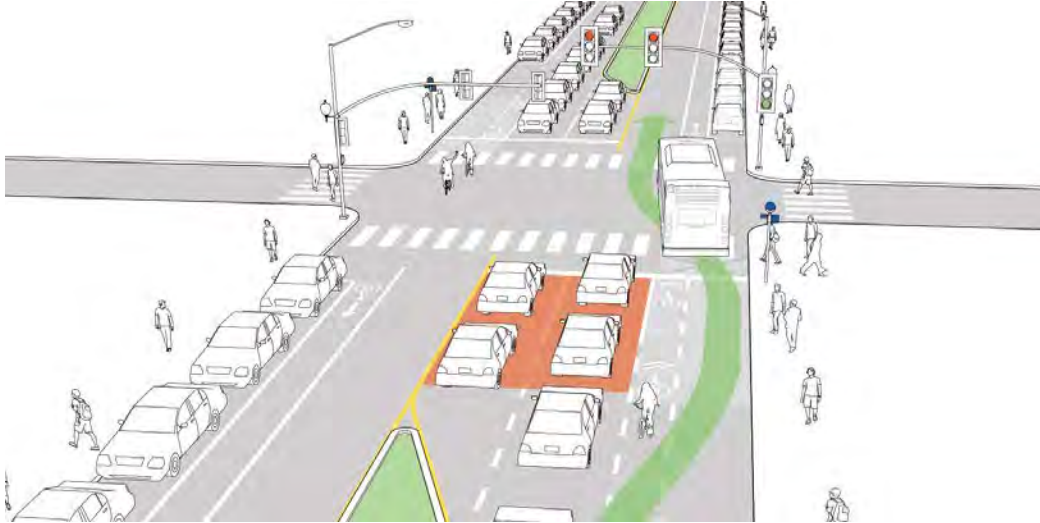


This Photo by Unknown Author is licensed under CC BY-NC

Queue Jumps

Queue Jumps give buses a brief leading interval, typically at a signal-controlled intersection, to more easily enter traffic from a dedicated transit lane or stop.

Figure 5: Queue Jump Example



Source: National Association of City Transportation Officials, *Transit Street Design Guide*, 2016

Bus Bulbs

Bus Bulbs are extensions of the sidewalk that align transit stops with the parking lane and allow active loading of transit vehicles without leaving the travel lane.

Figure 6: Bus Bulb Example

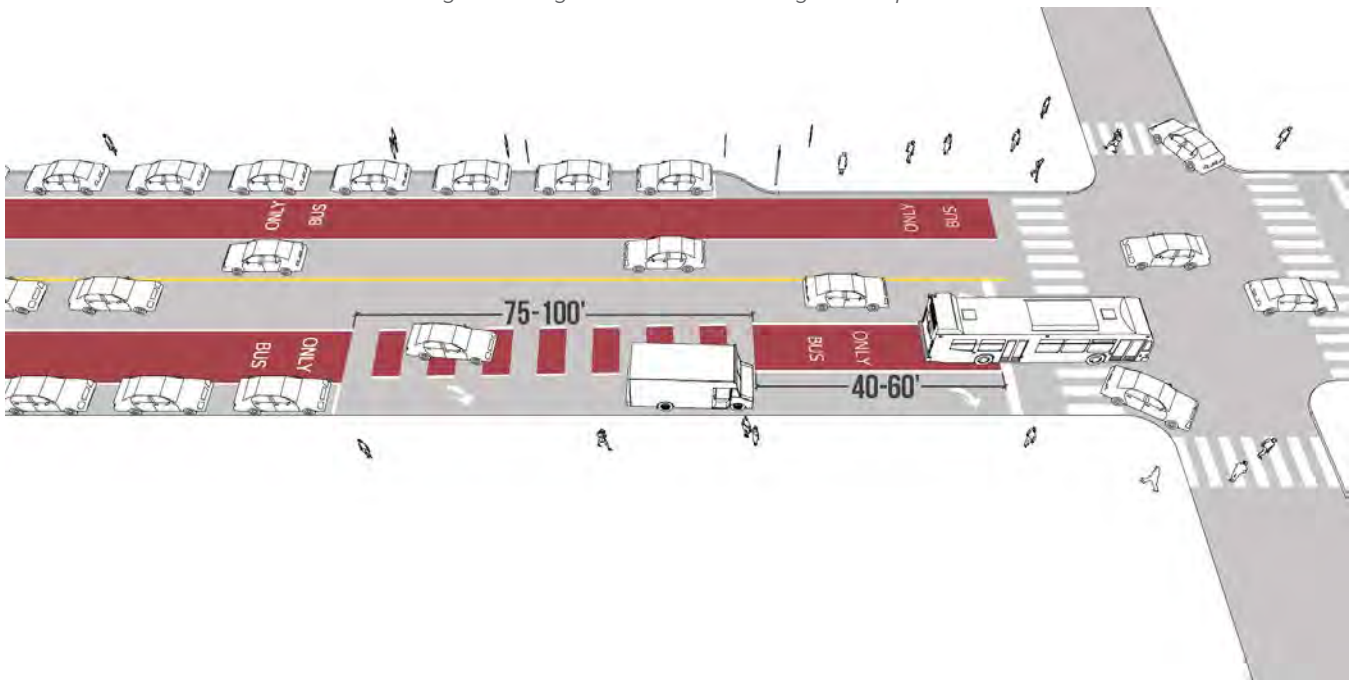


Source: National Association of City Transportation Officials, *Boarding Bulb Stop*, nacto.org

Right-Turn Pockets

Right-Turn Pockets can reduce transit delays caused by right turning vehicles within the transit only lane. Since these transit-only areas are often blocked by vehicles turning right, the creation of right-turn lanes can decrease the transit delay which results from these vehicles.

Figure 7: Right Turn Pocket Design Example



Source: National Association of City Transportation Officials, *Transit Street Design Guide*, 2016

Automated Enforcement

Automated enforcement of transit only lanes use cameras and license plate recognition technology to provide efficient enforcement of the lanes. Since manual enforcement to keep non-transit vehicles out of transit-only zones is time-intensive and often ineffective, automated enforcement is a better alternative. Automated enforcement relies on cameras mounted on poles or buses, to read license plates and record infractions.

Loading/Unloading Zones

Transportation Network Companies

Transportation Network Companies (TNCs), such as Uber and Lyft, provide on-demand, shared transportation services that often pick up and drop off at the curb. Managing these uses can involve the following technology:

Video Data Collection

Video data collection facilitates data collection over long periods of time of a specific area to identify passenger and driver behaviors such as frequency, peak times, and popular loading locations. This may help to better understand the frequency, peak times and locations of pickups /drop-offs.

Geofencing

Geofencing creates virtual geographic boundaries for where ride origin and destinations are permitted. This may help make it easier for drivers and passengers to find each other, as well as provide some order to where pickup/drop-off activities are occurring. Geofencing can also provide data on TNC activity.

Monetized Passenger Loading Zones

Curb space is a valuable asset that cities have the opportunity to leverage and forge agreements with TNCs. Each time a vehicle enters the passenger loading zone, created by a geo fence within the app, the City is pinged to collect the fee. Fees can also be implemented on a per-ride basis.

Deliveries

With the increase in internet retail, the demand for delivery by freight vehicles has increased. Deliveries includes commercial freight deliveries, shipping and parcel delivery services such as UPS and FedEx, daily mail service, messengers and now on-demand mobile app-based services such as Postmates and Grub Hub.

Monetized Commercial/Freight Loading

Monetized commercial/freight loading encourages turnover and efficient use of active loading zones. Paid access to freight loading and unloading zones can serve to reduce the duration of occupancy of these vehicles.

Demand Based Loading Zone Fees

Demand based loading zone fees can encourage commercial deliveries to occur during off-peak times by increasing rates during peak traffic and parking congestion times.



This Photo by Unknown Author is licensed under CC BY-SA

Demand Based Loading Zone Time Restrictions

Demand Based Loading Zone Time Restrictions restrict user types by the time of day, typically prioritizing active loading zones for commercial deliveries during typical business hours and passenger loading during evenings and weekends. Cities can work with commercial delivery services to encourage freight vehicles to deliver during off-peak periods.

Figure 8: Example of Loading Zone Time Limits



In the Future: Autonomous Vehicles

Autonomous vehicles (or AVs) are currently being developed and some industry experts believe these vehicles may be available within the next decade—first to ride-hailing companies like Uber and Lyft, and then to consumers.



While the impacts of autonomous vehicles on parking is under debate, a major component of planning for the future of AVs is providing adequate pickup and drop-off space at the curb. In the future, cities and towns may consider integrating their road and utility mapping with AV platforms to ensure AVs can appropriately navigate streets and account for road closures and other irregularities.

Pedestrian

Another important consideration in curbside management is the prioritization and enhancement of pedestrian space.

Curb Extensions

Curb extensions expand the pedestrian zone into parking lanes. These extensions provide opportunity to improve the pedestrian experience with increased landscaping, reduced crosswalk distances, and typically slow traffic speeds, especially among right turning vehicles.

Figure 9: Curb Extension Example



This Photo by Unknown Author is licensed under CC BY-SA

Widening Sidewalks

Widening sidewalks increases the pedestrian accessible area to allow increased foot traffic and reducing pedestrian exposure to vehicle traffic.

Figure 10: Wide Sidewalk Example



Parklets

Parklets create temporary or permanent pedestrian activated spaces within the parking lane. Converting areas beyond the curb line into public space by creating parklets creates a more inviting environment for pedestrians. Parklets might include public art, benches, landscaping, amenities, and creating spaces such as outdoor dining for social gathering without restricting pedestrian mobility.

Figure 11: Parklet Example



Bicycle

Curbside management strategies can seek to increase the ease and popularity of bicycles as a mode of urban travel, to reduce vehicular travel.

Protected Bikeways

Protected bikeways provide a separation from vehicular and pedestrian traffic via a barrier or difference in elevation that reduces pedestrian, bicycle, and vehicle conflicts. Best practice is to locate these bikeways on the curb side of vehicles and separated from pedestrian space. These lanes are typically for bicycle use only. A statistically-significant survey completed in 2017 found that a vast majority of North Texas residents would only be comfortable biking on large streets if there were a protected bike lane².

² Source: NCTCOG Bicycle Opinion Survey; www.nctcog.org/bikesurvey

Figure 12: Protected Bikeway Example



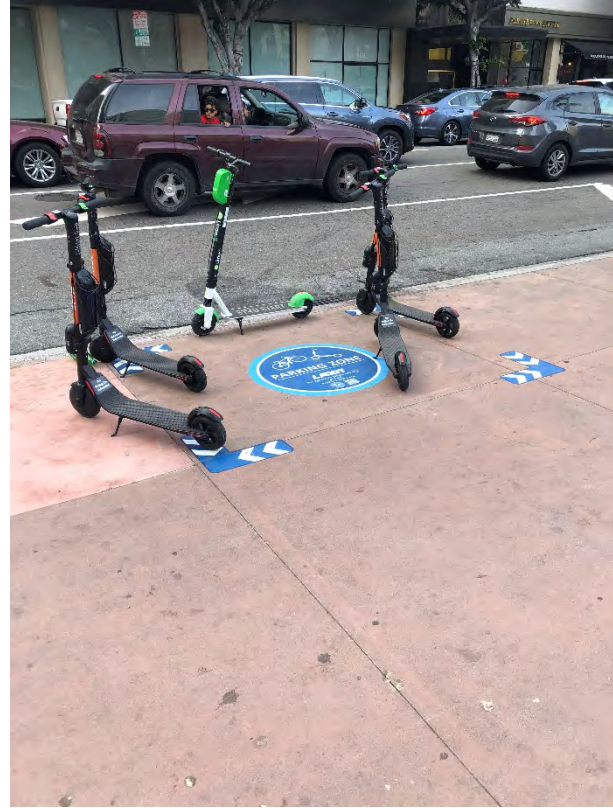
Shared, Motorized Mobility Options

Motorized shared mobility options, such as e-scooters and e-bikes, are fulfilling a significant need for first- and last-mile mobility. However, they can result in challenges for communities when it comes to right-of-way storage and usage.

Designated Parking Areas

Designated parking areas for micro-mobility options, aka “corrals”, prevent riders from leaving discarded e-scooters and e-bikes in a location that blocks access for others, particularly people with mobility challenges. In addition, this creates opportunities to designate “hubs” for these travel options, which can serve as first and last mile connections for transit. For example, corrals can be created at light rail stations or bus stops.

Figure 13: Examples of Shared Mobility Parking



Designated Ride Areas

Many cities have had challenges with determining the best location for patrons to use micro-mobility options, and particularly e-scooters. In many cases, the best location is dependent on the context of the street. For example, on neighborhood streets, the best ride location may be the travelway, while on slower arterials, the bike lane may be preferable. Cities may also decide to ban micro-mobility options from certain streets entirely (e.g. streets with a speed limit over 35 miles per hour). Ride locations should be designated by ordinance and promoted through digital communications and on-the-ground signage.

Figure 14: Designated Ride Area Example



Source: City of Santa Monica via Twitter, 2019

Parking

Studies show that a large portion of traffic volume is made up of people scouring the streets for parking. When managing parking, it's important to maximize curb use based on demand prioritizes. To reduce parking issues, curb regulations can institute a price or time limit on spaces and encourage use of often abundant off-street spaces.

Demand-Based Pricing

Demand-based pricing is a highly influential tool used to influence parking demand distribution and duration by pricing locations based on demand. This encourages more parking turnover over time and grants more vehicles, and therefore people, access to a location.

Time Limited Parking

Time limited parking impacts turnover of spaces by requiring parkers to move their vehicle after an established limit has been reached. Time limits may fluctuate based on time of day and/or location. Time limits may be based on the time of day's demands. For example, the curb could change from a loading/unloading zone in the early morning to a travel lane during commute times, then to a passenger loading zone for dinner, and finally to a long-term parking space overnight.

Off-Street Parking

Off-street parking requirements provide alternative parking locations to alleviate parking demands within the public right-of-way. These requirements are typically determined by the land use type, its density, and variable impacts of available alternative modes of transportation, population demographics and behaviors, and the existing land use mix of the site. Though off-street parking facilities are often privately owned, cities sometimes operate their own off-street facilities or develop agreements to make private parking facilities available to the public. Cities can take an active role in freeing up on street spaces through parking studies identifying excess parking capacity elsewhere and implement wayfinding and shared parking agreements to shift parking to those off-street spaces.

Figure 15: Time Limited Parking Example



Residential/Neighborhood Parking Permits

Residential/neighborhood parking permits can be used to prioritize parking availability for specific users, exempt permit holders from paid or time limited parking regulations in transitional areas that experience both commercial and residential parking demands, or manage spillover impacts from under supplied developments on the public parking system.

Flexible Curb Lanes

Flexible curb lanes convert traffic lanes to on-street parking lanes during off-peak traffic times and are useful for areas with restaurant space and active nightlife or weekend activities. This is generally accomplished through a solid white line between this lane and permanent travel lanes, as well as signage indicating the hours during which the lane is available for parking or travel.

Parking Benefit/Management Districts

In most walkable areas, parking does not need to be provided at each property or in front of properties on-street, but rather can be provided at central locations throughout the district or neighborhood. Parking Benefit Districts or Parking Management Districts are specific areas where revenues are generated and then used for parking and transportation operations, management, amenities, and improvements. These areas must have specific boundaries, as well as a distinct revenue stream either in the form of paid parking fees, an assessment from business and property owners in the district, or a combination thereof. These management districts offer a clear administrative entity among multiple property owners, and are authorized to make decisions about parking and curb management and fund improvements.



03 Implementing Curb Management

Curb Management Planning Guide

When do you Need Curb Management?

A primary goal of curb management is to bring both order and safety to the curb. Determining when a street or segment needs a curb management plan is largely reliant on observed activities occurring at the curb. To assist communities in the Dallas-Fort Worth region, a series of steps were developed to determine when a curb management plan is needed and what factors to consider when making that determination.

A common misconception is that active curb management is only appropriate for large cities, like New York, San Francisco, or Dallas. On the contrary, phased and intentional curb management is an essential component of mobility strategy for communities of all sizes.

The following figure (Figure 16) depicts the different levels of curb management—from establishing public use of the right-of-way, to creating designated areas for different modes of travel, to monetizing curb space. Because of the diverse and multi-faceted nature of curb management as a practice, communities can move forward with the treatments that work best for their contexts and constituency.

Figure 16: Curb Management Scale



Community Checklist

Determine in which Tier your community falls and implement next steps

The following section discusses a generally progressive, cumulative approach to curb management. Communities that fall into multiple tiers, or have completed steps in higher-level tiers but have yet to complete steps in lower-level tiers, should focus on the steps most in line with their most recent transportation, parking, or mobility planning goals. An example is a community that has already implemented paid parking in its major downtown on-street corridors, but has recently adopted a Comprehensive Plan with a major goal of increasing greening, public space, and pedestrian amenities in major activity areas. In this case, this community should focus on Tier 3 goals, such as clear, physical separation between the travelway and the sidewalk, sidewalk extensions, and general pedestrian enhancements.

Tier 1

Communities in Tier 1 are just beginning their curb management journey. Communities in this stage should focus on:

- ✓ Creating physical distinction between private property and the public right-of-way (e.g. by installing sidewalk, curb, and gutter).
- ✓ Monitoring community usage of curb space, with a focus on vehicle and equipment storage in the public right-of-way.

Tier 2

Communities in Tier 2 have a defined right-of-way in most areas (particularly downtown areas) and are considering or have started enforcing appropriate use of the curb space. Communities in this stage should focus on:

- ✓ Developing ordinances regulating the use of the curb space (e.g. vehicle storage and abandonment or parking time limits).
- ✓ Implementing these ordinances using regular enforcement.
- ✓ Educating the community about these ordinances and their importance.
- ✓ Continuing to monitor usage of curb space and identify challenge areas, e.g. through a parking study.

Tier 3

Communities in Tier 3 are taking further steps to make the curb a public space. This might include enhancements to the sidewalk (e.g. landscaping or street planting), adding benches or other amenities, or creating standard bike lanes. Communities in this stage should focus on:

- ✓ Creating physical distinctions and barriers between the travelway and pedestrian space at the curb.
- ✓ Identifying opportunities to enhance the pedestrian environment through street planting, seating, and other amenities for people.

- ✓ Continuing to monitor usage of curb space and identify challenge areas and areas of opportunity, e.g. through a parking and mobility study.
- ✓ Identifying areas where delineation of modes, e.g. separated bike lanes or extended sidewalks, may be appropriate.

Tier 4

Communities in Tier 4 are starting to physically allocate curb and right-of-way space for different modes of travel. Communities in this stage should focus on:

- ✓ Monitoring usage of space designated for certain travel modes, such as separated bike lanes.
- ✓ Developing a prioritization policy for creating space for travel modes and activities.
- ✓ Conducting community outreach to assess qualitative needs and identify areas for additional curb management.

Tier 5

Communities in Tier 5 are starting to use physical changes in the curb space to improve the efficiency of their transit systems—for example, through separated bus lanes. Communities in this stage should focus on:

- ✓ Creating a transportation demand management plan.
- ✓ Collecting data on transit system usage and needs to appropriately allocate resources.

Tier 6

Communities in Tier 6 have monetized their curb space through paid parking (e.g. meters or kiosks). Communities in this stage should focus on:

- ✓ Setting a clear policy goal for parking pricing (e.g. balancing parking demands or encouraging the use of other transportation modes).
- ✓ Monitoring parking revenues, particularly the impacts of other vehicle-based transportation usage on revenue totals (e.g. Uber or Lyft and commercial deliveries).

Tier 7

Communities in Tier 7 have expanded their curb infrastructure to accommodate newer transportation modes, such as Uber and Lyft, e-scooters and e-bikes, parklets and other community space, and commercial deliveries. Communities in this stage should focus on:

- ✓ Setting clear policies for regulation and usage of newer modes of travel.
- ✓ Monitoring the impacts of vehicle-based transportation usage on parking revenues and identifying opportunities to monetize curb usage outside of on-street parking in order to recoup costs (e.g. e-scooter and e-bike fees, delivery permits, etc.).

Curb Management Planning

1. Where are the Major Activity Centers?

Typically, curb management policies can provide the most benefit in areas where many different activities are occurring at once.

Central business districts (the central commercial and business center of a city) and entertainment districts are typically prime candidates and in the most need of curb management plans. This includes downtowns, theaters, stadiums, arenas, shopping destinations, mixed-use developments, bars and restaurants, and areas with an active night life. It is typically in these locations that the curb experiences a range of activities including high volumes of TNC pickup/drop-offs and transit ridership.

Central business districts (CBD) and downtowns have also been the primary locations to receive dockless scooters or bikes, likely being parked at curb and along sidewalks of busy streets. CBDs and entertainment districts also typically have the most bars and night life, resulting in patrons needing methods of travel outside of driving themselves.

CBDs, downtowns, and entertainment districts also typically have the most convergence of multiple modes of travel. For example, people leaving restaurants might be getting picked up by a rideshare company/TNC, be walking to their parked car, or hopping on an electric scooter to reach their next destination or travel home. These districts may also have significant underutilized off-street parking at various times of the day which, with appropriate coordination, can be a better place for parking than the curb lane. Without curb management, the combination of these activities occurring simultaneously may result in a chaotic, confusing situation for patrons and drivers.

Without curb management, the combination of activities occurring simultaneously may result in a chaotic, confusing situation for patrons and drivers.

Airports are also prime targets for curb management, especially as TNC pickup/drop-offs are drastically increasing at airports across the country, contributing to intense congestion at the curb.

Hospital and college campuses may also benefit from curb management plans as these types of land uses typically require large volumes of people traveling into/out of the campus via a variety of modes.

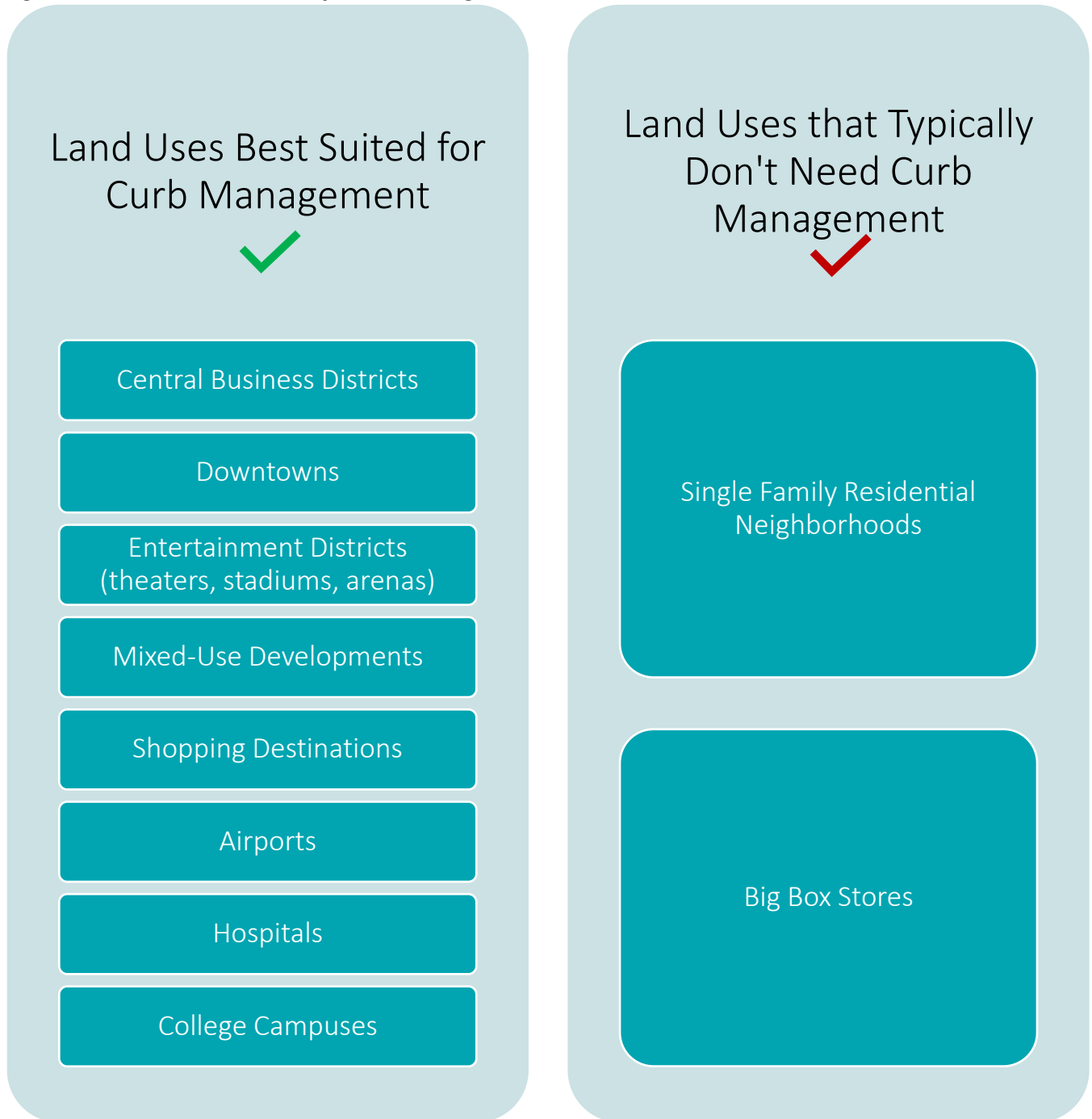
In contrast, a single-family residential neighborhood, with calm, quiet streets, will likely not need a curb management plan or policies due to the limited activity occurring at the curb. Similarly, big box stores, such as Walmart, Costco, and Home Depot, provide large parking lots and people typically access these stores with cars in order to transport their purchased items. Therefore, most people accessing these types of stores will likely not be arriving via alternative modes, leading to very little activity at the curb.

The types of curb management strategies implemented will also vary considerably depending on the context, location, and identified needs. There is no one-size-fits all for curb management solutions.

To determine if a roadway or street segment needs curb management, communities should consider both the purpose of the curb and gather information on existing conditions.

Once major activity centers have been identified, communities should start developing a purpose for the street segments identified and assigning priorities, as described in the next section.

Figure 17: Land Uses Most Suited for Curb Management

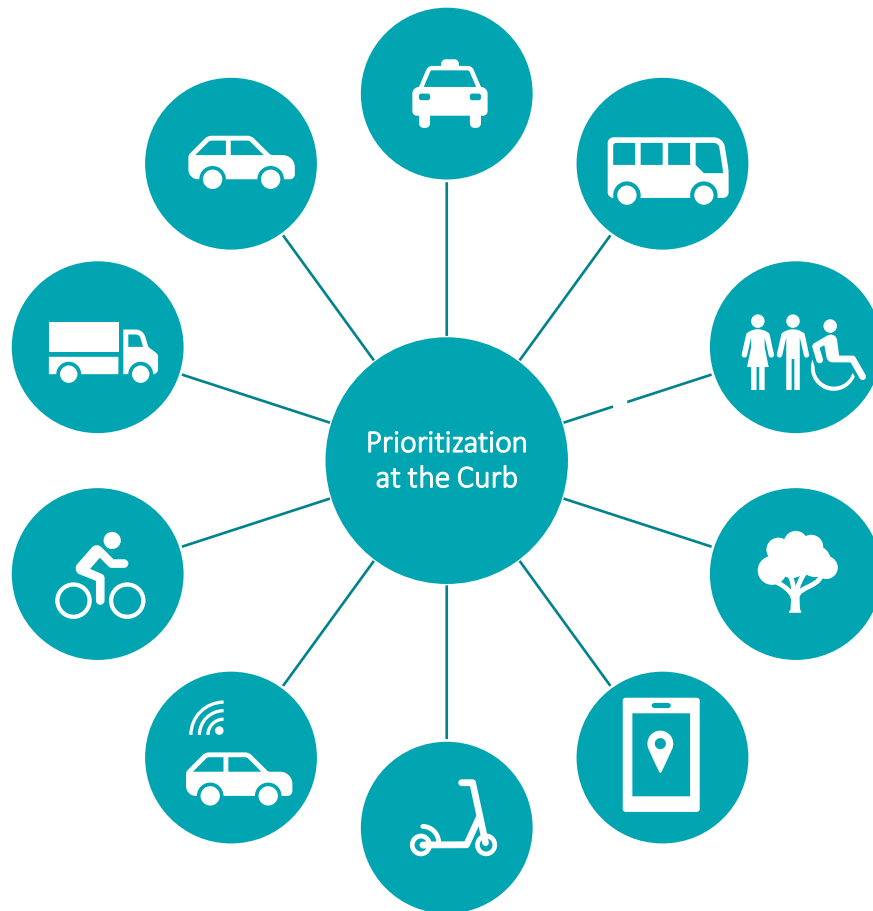


2. Develop Purpose and Assign Priorities

The second consideration when determining the need for curb management is understanding the purpose of the curb and developing a prioritization of user groups. Identifying the primary purpose of a street segment and establishing priorities is key in developing policy and regulations at the curb.

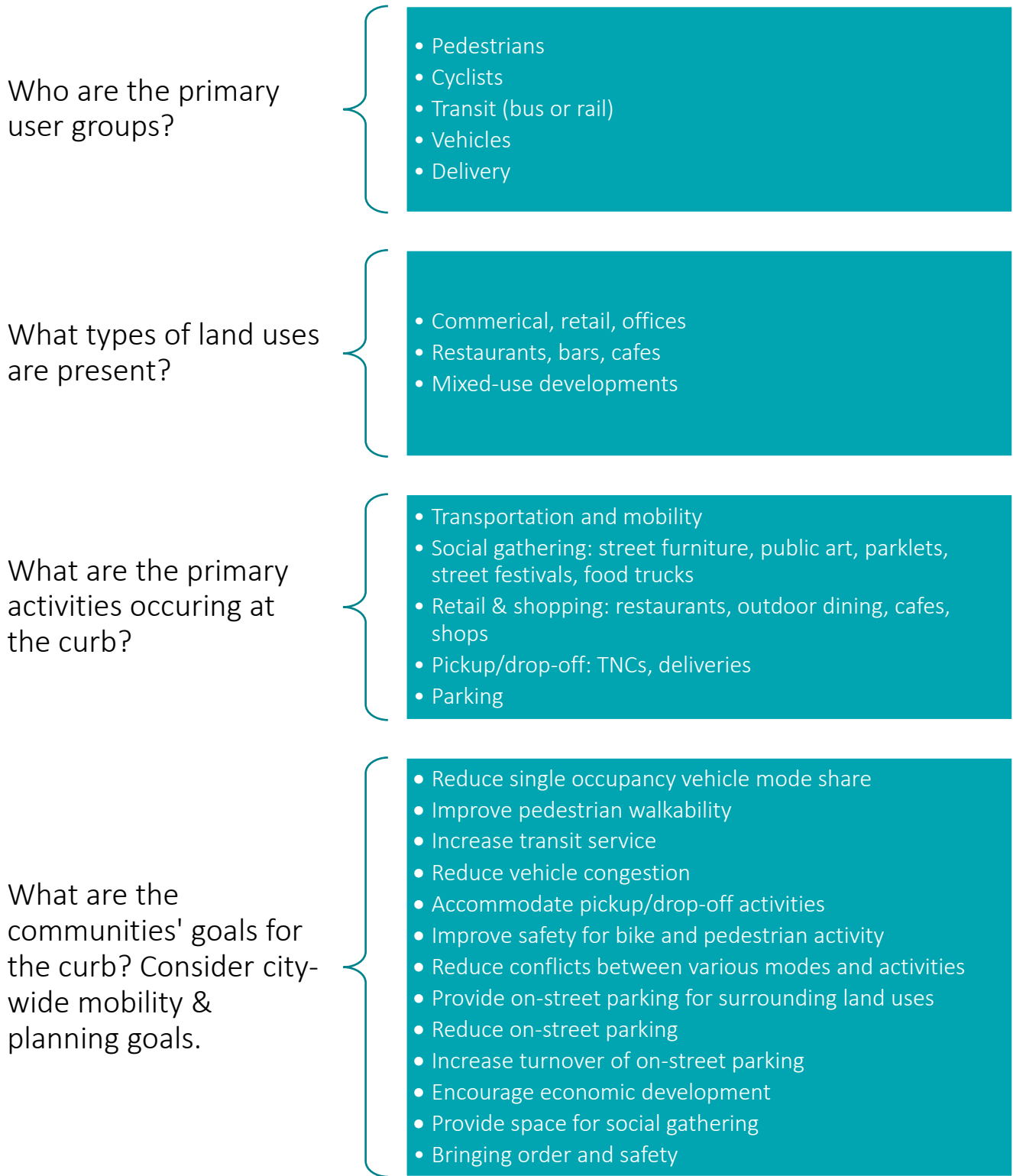
City streets provide a broad range of functions including through-traffic, pedestrian travel, bicycle routes, and transit routes, with these functions often mixed together. To begin narrowing down the types of curb management that should be considered, prioritizing these functions is important.

Figure 18: Prioritization Considerations



In order to establish a purpose and assign priority, the following questions should be considered:

Figure 19: Questions to Consider in Determining Curb Access Prioritization



Asking these questions may reveal what the purpose of the street segment is as well as how the different activities should be prioritized. For example, if through answering these questions its revealed that the city's goals are to

reduce congestion and that the area is bustling downtown with high amounts of pedestrian and transit activities, the community may then want to consider curb management strategies that prioritize transit and pedestrian improvements.

There is likely more than one answer to each of these questions. *Mobility 2045*, NCTCOG’s regional transportation plan, notes that roadways should be planned to accommodate three modes of travel. To aid in the prioritization process, communities may also ask themselves what three modes need the most access in this area.

When determining priorities, communities should consider the key functions of the right-of-way, as discussed in Section 1. These functions can help provide the language necessary to describe the primary purpose of the street and right-of-way. Considering these functions will also help understand which users will benefit most from their implementation.

In creating a prioritization policy, broader planning and policy goals should also be considered. For example, if a city recently conducted a multimodal plan with a major goal of encouraging use of active travel modes in the downtown core, curb management treatments focused on accommodating active modes should be prioritized in that area. The following figure is a hypothetical prioritization matrix a community might use to select treatments and initiatives at the curb. The matrix depicts the ranking of various priorities in different land use contexts. This prioritization may vary widely based on the broader goals of the community—for example, if economic growth is ranked as priority “1”, maximizing access for business may be the most important element in any curb management decision. This might include designating commercial loading areas. Conversely, if building a healthier community is ranked as priority “1”, access for people, activation of community space, and greening may be viewed as more essential.

The matrix below depicts a sample prioritization in each land use case. In each case, the community’s comprehensive planning goals are ranked as the most important priority in determining appropriate curb management treatments and initiatives. Land use cases vary on other priorities for treatments—for example, in a residential context, access for people is the second highest priority. In a commercial context, access for business is the second highest priority. This might manifest through increased street-planting, greening, and extended sidewalks in a residential community, and increased commercial loading areas in a commercial area.

Table 1: Sample Prioritization Matrix

	Industrial	Residential	Commercial	Mixed-Use/CBD
Comprehensive Transportation Plan Goals	1	1	1	1
Access for Business	2	5	2	3
Access for People	3	2	3	2
Activation of Community Space, Greening	5	3	5	4
On-Street Parking	4	4	4	5

Once the purpose, user needs, and goals of the roadway are determined, the next phase of information gathering should begin.

3. Information Gathering and Existing Conditions

After priorities and purpose are established, to consider if a street needs a curb management plan, it is important to understand the existing demands of the curb. Understanding what is currently occurring may help identify the types of curb management strategies that should be implemented. Since curb management plans are highly context specific, it is vital to understand the unique mix of land uses, modal splits, and activity occurring at the curb in question.

Field observations are a key component in determining the need for curb management. Observing the curb and the types of activities occurring in real time is key in identifying demands and conflict points. This will also assist communities in understanding how their streets are meeting their land use and mobility goals, and if the way the curb is currently functioning prioritizes the correct modes. For example, if it is determined that the priority of the street segment in question is for bicycle travel, but it is observed that vehicles regularly are parking and blocking the bike lane, curb management strategies may assist in reducing this conflict. However, unless someone is out in the field to make these observations, these types of conflicts may be missed. Additionally, field observation may provide insight on how to consolidate drop off and/or delivery-loading zones for multiple business at an accessible/shared location and reduce this particular demand.

Additionally, having data on how the street is currently designed, existing amenities, and the land uses the street is serving, is also important in determining the need for curb management. This will assist communities in understanding current conditions and how the street may be impacted if curb management strategies are implemented. For example, if the curb is primarily dedicated to on-street parking and it is determined that the city wants to prioritize pedestrian and transit activity, it is helpful for the city to understand the impact of potentially losing a parking space to a parklet or transit bulb out by knowing the existing parking supply and demand.

The following provides a list of considerations of the information that should be collected in order to adequately understand the curb and street's existing conditions. It is noted that the need for curb management is highly context specific and that the data collected may be unique to that area in question. However, this list is intended to be a starting point to help communities consider the type of data they may need in making this evaluation.

Figure 20: Information Gathering Considerations

Field Observations - Field surveyors should spend time in the study area to observe activity at the curb. Surveyors should look at the following:

- **General activities at the curb**
 - What types of transportation/modes are utilizing curb space? Bikes, scooters, pedestrians, transit, vehicles/parking, TNC pickup/drop-off, deliveries
 - What types of activities are people engaging in? Walking, entering/exiting shops, parking, cycling, looking for an Uber/Lyft, picking up a scooter, sitting on street furniture, buying something from a street vendor, etc.
- **What types of amenities are provided at the curb?**
 - Outdoor dining, street seating, parklets, bicycle parking, bus stops and shelters, TNC pickup/drop-off zones
- **Observed conflicts**
 - Double parking for pickup/drop-off activities, blocking travel lanes
 - Vehicles parking/stopping in bike lanes or at bus stops for short-term parking or pickup/drop-off
 - Bicycles struggling to navigate around vehicles and buses
 - Buses moving slowly due to vehicle congestion
 - Scooters parked on sidewalks blocking pedestrian paths
 - Bicycles and scooters sharing travel lanes with passenger vehicles

Identify existing land uses

- What type of land uses are present? E.g. retail, office, restaurant/bars, cafes, residential, mixed-use

Review existing roadway and street characteristics

- **Vehicle**
 - Number of travel lanes, width of travel lanes, presence/number of on-street parking spaces, loading/unloading zones, location and number of ADA parking spaces and access points
- **Pedestrian**
 - Sidewalks, width of sidewalks, crosswalks, bulb outs
- **Transit**
 - Bus lanes and stops, rail lines and stops
- **Bicycle**
 - Bike lanes, bikeways, bike parking
- **Signage and Wayfinding**
 - Directional and informational signs, e.g. landmark signage, signage dictating parking/no-parking areas, restrictions, etc.

Existing regulations that may impact curb space utilization

- Parking time-limits, municipal codes relating to the curb

Site characteristics

- Farmers markets, special events, mobility hubs (convergence of major bus routes, transit lines, bike paths, etc.)
- Greening and landscaping including street trees, public art, planters

Quantitative data - collected data on the number of modes using the curb may also assist in determining the need for curb management. Types of data to collect include:

- Parking occupancy counts (at the curb and off-street lots and garages if possible/ per context)
- Land use contexts and patterns (ideally mapped on GIS or similar platform)
- Traffic Counts
- Transit schedules, headways, frequency
- TNC pickup/drop-off
- Number of deliveries
- Number of scooter/bike users

Along with collected data and observations, it is important to analyze existing data maintained by transit, parking management, and/or municipal agencies. Additionally, approved or constructed development plans for parcels abutting the public right-of-way can be reviewed.

4. Evaluate the Data and Make a Determination

Once priorities and purpose have been established and data has been gathered along the curb segments in question, the city needs to determine if the location is a good candidate for a curb management plan. If it is found that the segment is not meeting the intended purpose or prioritizing the right modes, and data indicates that there are multiple conflicts or high volumes of various user groups trying to access the curb, implementing a curb management plan may help in bringing order and efficiency to the curb.

Selecting Treatments

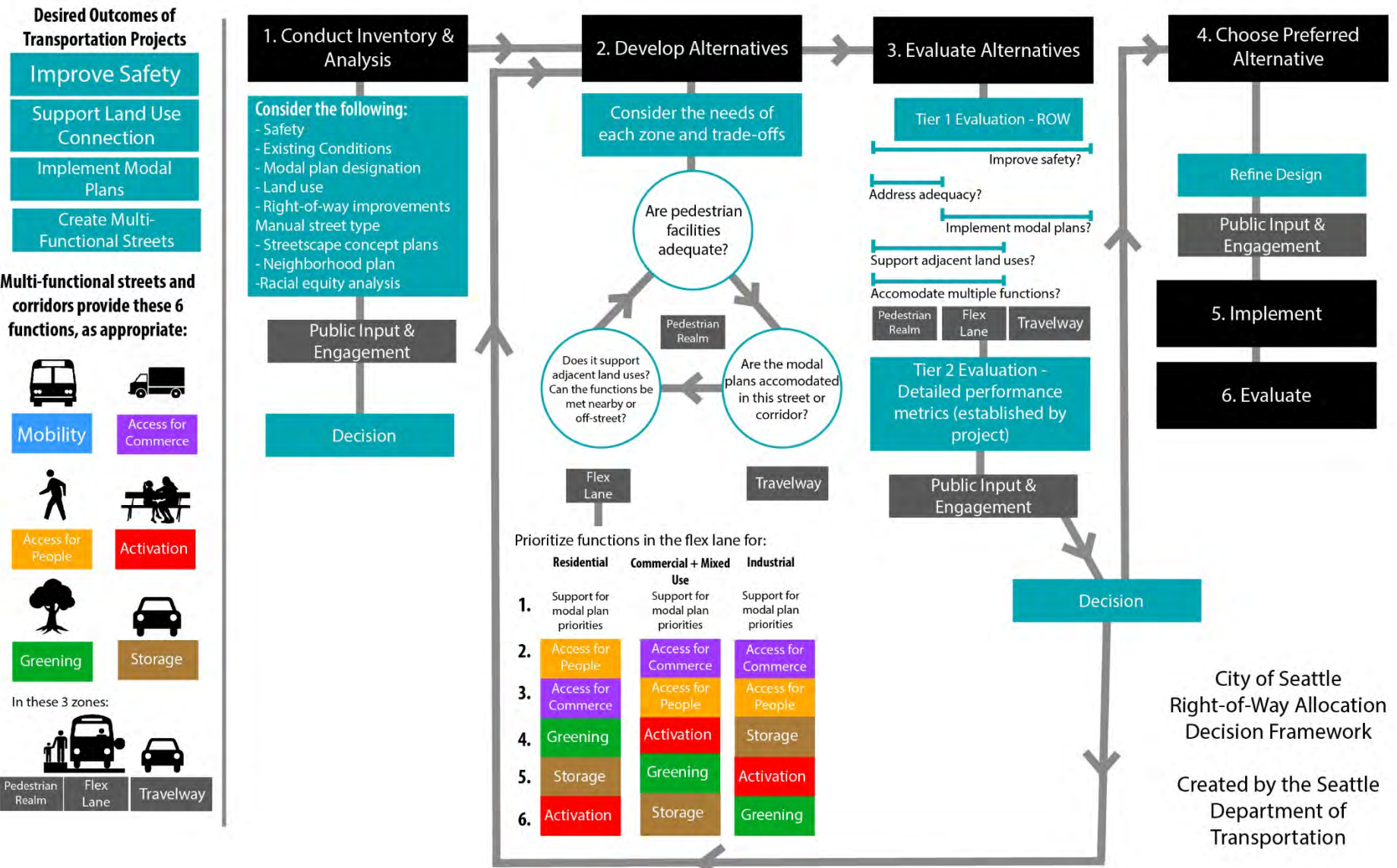
If a community decides it would like to pursue a curb management plan, the process of selecting treatments should begin. Treatments will be highly dependent on modal prioritization and observations and data collected in the field. Additionally, understanding that context, mix of land uses, and policy and regulations surrounding the curb will also influence the type of treatments selected.

In general, curb management planning is a series of trials and errors. It entails regular testing of what types of treatments will work, what is a good fit for the area, and how the public might respond. These treatments will likely change over time, so curb management treatments should be selected with flexibility in mind, especially as mobility options and technology continue to evolve.

The City of Seattle is a national leader in curb management and has one of the most advanced processes for decision-making for right of way (ROW) treatments (highlighted here). This process begins with determining the desired outcome of the transportation project. The following decision framework includes: 1. Conduct inventory and analysis, 2. Develop alternatives, 3. Evaluate alternatives, 4. Choose preferred alternative, 5. Implement, and 6. Evaluate.

In this process, communities are instructed to determine the desired outcome of a ROW project, evaluate existing conditions, develop alternatives based on user needs, analyze benefits and trade-offs, evaluate these alternatives, and then choose a plan to implement based on this analysis. This also includes analyzing if the proposed alternatives meet the desired outcomes as well as gathering public engagement through the process. Once a design has been refined and reviewed by the public, it should be implemented. After implementation, the project should be evaluated for effectiveness. This decision-making process is shown in Figure 21.

Figure 21: City of Seattle Right-of-Way Allocation Decision Framework



Source: Adapted from an original graphic created by the City of Seattle Department of Transportation; Graphic recreated by Walker Consultants, 2020

Evaluating Tradeoffs

Part of the selection process will also be evaluating trade-offs. When one mode or service is prioritized over another, another mode might be impacted. Additionally, if roadway characteristics may be altered, it could have an impact on the rest of the system.

Also, with most treatments, there will be costs associated with implementation. This may mean costs of infrastructure, loss of parking revenue, administrative costs, cost of enforcement of new rules and regulations, etc. It is important for communities to weigh these costs with the benefits that might be achieved from implementation.

In general, major benefits to consider despite trade-offs are the potential for various treatments to contribute to greater economic activity on the street, traffic calming (reduce speeding and improve safety for all modes), navigation, and order.

Table 2 provides a summary of benefits and trade-offs to consider when selecting various curb management treatments for each mode.

Table 2: Benefits and Trade-offs of Curb Management Treatments

Treatment Type	Benefits	Trade-off
<p>Transit</p> <p><u>Examples:</u> Transit lanes Bus Bulbs</p>	<ul style="list-style-type: none"> • More frequent headways • Increased transit service • Economic activity (more people can access the area); greater access for jobs and shopping • Increased travel time • Safer boarding/unloading • Less congestion for both buses and vehicles as buses have more dedicated space separate from vehicular travel 	<ul style="list-style-type: none"> • Potential loss travel lane/vehicle throughput • Cost of infrastructure and operation • Considerations for bike lanes (ensuring bus bulbs or lanes do not conflict with bike routes/lanes)
<p>Loading/Unloading Zones</p> <p><u>Examples:</u> Dedicated pickup/drop-off spaces for TNCs Dedicated pickup/drop-off spaces for deliveries TNC and commercial delivery fees</p>	<ul style="list-style-type: none"> • Reduce instances of double/illegal parking • Greater compliance from delivery drivers • Provide safe space for TNC drivers/passengers to meet • Potential revenue source if a pickup/drop-off fee is implemented • Safer pickup/drop-off for drivers and passengers • Improve traffic flow by reducing double parking/blocking travel lanes 	<ul style="list-style-type: none"> • Loss of on-street parking • Loss of parking revenue if spaces are paid
<p>Pedestrian</p> <p><u>Examples:</u> Curb extensions Wider sidewalks Parklets Crosswalks</p>	<ul style="list-style-type: none"> • Improved pedestrian safety • Encourage walking and promote health • Walkable downtowns/communities • Economic activity (more people on the street accessing businesses) • Traffic calming 	<ul style="list-style-type: none"> • Cost of infrastructure • Potential loss of travel lane and on-street parking (depending on treatment and available ROW)
<p>Bicycle</p>	<ul style="list-style-type: none"> • Increased bike access 	<ul style="list-style-type: none"> • Cost of bike infrastructure

Treatment Type	Benefits	Trade-off
<p><u>Examples:</u> Protected Bikeways Shared Mobility Device and Bike Parking</p>	<ul style="list-style-type: none"> • Safer bicycle routes • Reduced vehicle/bike conflicts • Traffic calming 	<ul style="list-style-type: none"> • Potential loss of parking/parking revenue
<p>Parking</p> <p><u>Examples:</u> Demand-based pricing Time limits Parking technology, mobile app wayfinding</p>	<ul style="list-style-type: none"> • Greater parking turnover • More open spaces, reducing instances of circling/congestion searching for a space • May encourage people to use alternatives instead of driving and parking 	<ul style="list-style-type: none"> • Cost of enforcement • Infrastructure costs (meters, pay-on-foot machines, etc.). • Public feedback – if spaces were once unpaid, may be some disapproval from both patrons and business owners if a fee is implemented • If space is dedicated to parking, less space may be available for curbside treatments benefiting other modes e.g. transit lanes, bike lanes, parklets, etc.
<p>Vehicle Storage Restrictions</p> <p><u>Examples:</u> Regular Street Sweeping Vehicle Abandonment Ordinances</p>	<ul style="list-style-type: none"> • Clear distinction between public right-of-way and private property <p>Ability to ensure public access to the right-of-way for construction projects, utility work, etc.</p>	<ul style="list-style-type: none"> • Creates some challenges in residential environments (people will have to locate alternative storage locations and form the habit of moving their vehicles during street sweeping operations)

Selecting Alternatives

It is also important to consider the short and long-term implications for curb management strategies. A parklet can be low-cost and flexible, moving locations as needs change. A bike lane requires public outreach considerations, significant infrastructure costs, and is more permanent. Considering alternative treatment opportunities is beneficial as each treatment will have varying levels of complexity and cost. Communities may want to consider short-term strategies in the interim while consider larger, corridor-wide projects that may have greater impact and changes to the existing ROW.

Static & Flexible Curb Management

The combination and types of curb management strategies vary considerably and may be designed to change over the course of a day. Curb management treatments may be static and/or flexible depending on the types of activities occurring on the street and treatments implemented.

Static Curb Management

Static curb management strategies include permanent treatments such as protected bike lanes, bus only lanes, and bus bulbs. The installation of a bike share or permanent implementation of a parklet might also be static. Additionally, on-street parking as well as striped loading zones may also be considered static as they serve a single, unchanging use.

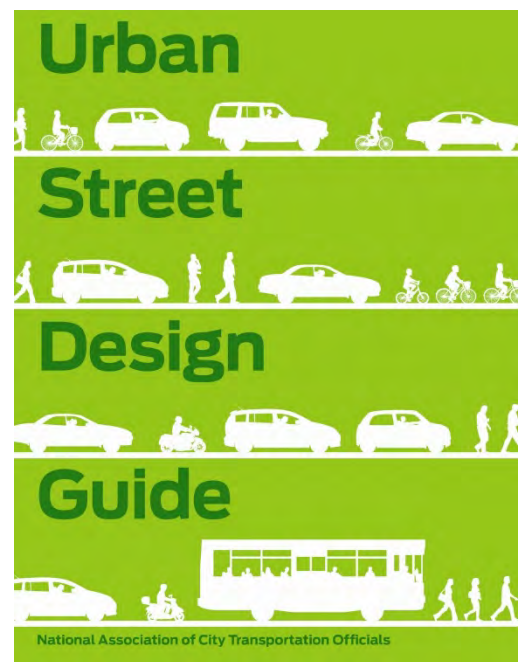
The implementation of static curb management requires an extensive evaluation by community planners and city engineers to determine the viability of installing more permanent infrastructure such as bike or bus lanes, as well as developing the designs for these plans. These types of treatments should also be considered in partnership with the communities' greater mobility and planning goals, including a robust public outreach process, as they are likely to have longer-term impacts and change existing ROW allocations.

Communities interested in designing more multi-modal streets may also reference NACTO's *Urban Street Design Guide* which provides greater detail on designing streets with these multi-modal elements.

Flexible Curb Management

The curb may be designated as a "flex zone" with modal and service priorities shifting throughout the day based on needs. This can be specified through signage and other physical markings (such as painting and striping) and enforced via digitized in-person options or camera-based technologies.

In general, freight movement and deliveries are prioritized at the curb in the very early morning and late at night. At this time, there is little to no passenger activity at the curb and most businesses are closed. Delivery vehicles will likely be able to make more efficient deliveries at these times without conflicts between other modes of travel.



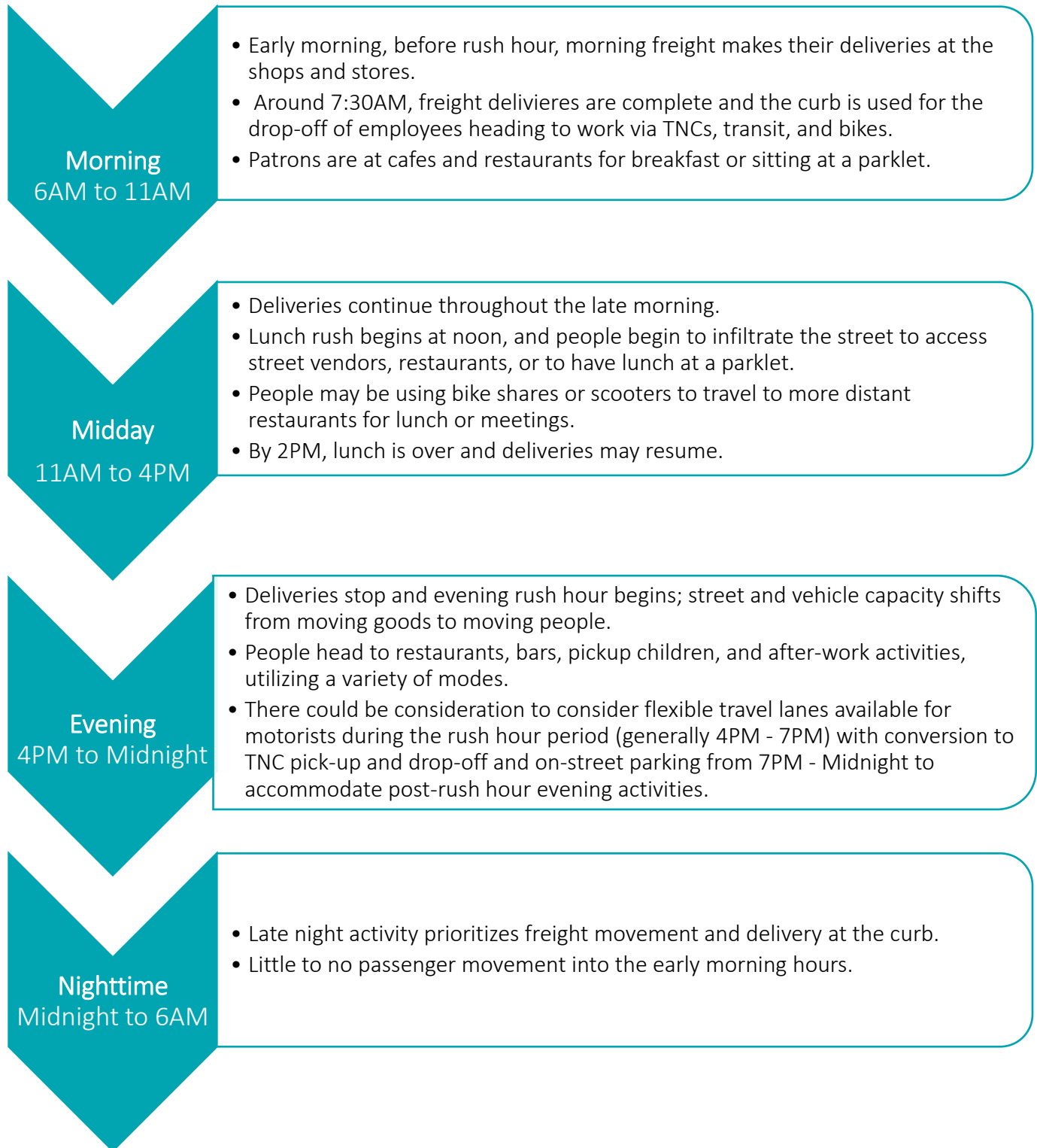
During morning and evening rush hours, people movement is prioritized, and deliveries paused to make way for buses, TNC pickup/drop-off, bike access, and pedestrians walking. The morning and evening hours will also see an increase in patrons accessing restaurants, cafés, and parklets for breakfast and dinner.

Deliveries and package delivery can continue to occur during off-peak hours, between 2:00 p.m. and 4:00 p.m., but should cease by 4:00 p.m. as evening after-work activities begin and passenger travel at the curb is needed.

An example of this type of schedule is shown in Figure 22.

Additionally, if a community is interested in bus lanes but also want to maintain some on-street parking, lanes may be converted to bus-only lanes during peak hours and allow parking during non-peak hours.

Figure 22: Flexible Curb Example



Source: Adapted from *Curb Control*, *Planning Magazine*, June 2019

Options Analysis for Modes not Prioritized

Due to the high amounts of activity and varying needs at the curb, it is unlikely that every mode or need will be able to be fully accommodated at the curb itself. It is at this point when decision makers will need to determine which modes should be prioritized at the curb and identify alternate locations for the others.

Greater prioritization of non-SOV modes at the curb often results in a loss of on-street parking. Since many people will still need to park their car in these areas, accommodating that parking demand in alternate locations is important.

On-street parking is often the most desirable and highly utilized parking, which often leads to many off-street parking facilities, including lots and garages, being underutilized. As cities consider removing parking at the curb to provide greater access to non-SOV modes, a parking supply and demand study should be conducted in order to determine where the greatest demand is occurring and, more important, where excess availability may be located. As these areas are identified, communities may begin strategizing and creating plans to direct more parkers to these underutilized locations. This may include additional wayfinding or reduced parking rates to encourage parking in these areas.

Underutilized parking areas may also be potential locations for TNC pickup/drop-off if there is not space at the curb to provide loading zones, or if pickup/drop-off volumes are high and needs several spaces to safely pickup/drop-off passengers.

Additionally, while main streets within commercial corridors or a community's downtown district may be highly utilized by multiple modes of travel, some side or adjacent streets may experience lower volumes of travel. These streets may be able to aid in providing space for curb management treatments if the main street cannot. Similarly, deliveries may also be moved to adjacent streets.

For example, a few parking spaces could be removed on an adjacent street in order to provide loading zones for TNC pickup/drop-offs. Bike share parking or dockless vehicle parking may also be able to be provided on an adjacent or side-street. Further, if a community would like to maintain some on-street parking in their downtowns, parking may be preserved at the curb on these adjacent streets.

Identifying these alternatives and moving some of this activity off the curb allows for more space to be allocated to other modes and provide more people-serving amenities like parklets, bike lanes, and transit stops.

Moving parking and pickup/drop-off activities off the curb also creates greater opportunities for ROW changes like bus lanes, wider sidewalks, bike lanes, and bus bulbs.

Education and Outreach

With changes to the public ROW during the curb management treatment selection process, it is important to include public input and feedback when evaluating options.

There are a variety of methods to do this. This may include public surveys, advisory boards, and stakeholder groups.

Pilot Programs

One of the most effective methods of presenting curb management treatment options is to organize a pilot program and test of the proposed strategies. This would include a temporary installation of the proposed curb management treatment.

A pilot program allows community members to interact and engage with the treatment and provide feedback on their experience. This feedback would allow for adjustments to be made to the proposed treatment in order to best serve the corridor and community prior to more permanent implementation.

Key elements of successful pilot programs include:

- **Effective Timeline:** The pilot should be active and in place for a minimum of 90 days (roughly 3 months) to ensure members of the public have adequate exposure with the treatment, and that behaviors around the treatment can be formed and observed.
- **Promotion and Outreach:** Cities and towns implementing pilot programs should conduct outreach in a variety of forms to alert the public and begin to gather feedback. Outreach can include (but is not limited to) public meetings where members of the public can test out the technology or view a version of the treatment, press releases and media partnerships, a project website, social media posts, and an online survey to collect feedback from those who have used the pilot.
- **Active Follow-Up:** During and immediately following the pilot program, cities and towns should collect feedback from users on their experience of the treatment, assessing ease of use and level of satisfaction, and gathering information about any unseen issues.
- **Decision-Making:** Finally, the municipality should decide the fate of the pilot. Options may include continuing the pilot to gather more information, terminating the pilot and exploring other solutions, or creating a permanent version of the pilot.

Following are examples of successful curb management pilot programs in cities of widely varying population sizes and land use contexts.

Figure 23: Example of Protected Bike Lane Pilot



This Photo by Unknown Author is licensed under CC BY-NC-ND

Eagle, Colorado- Vehicle Storage Enforcement

The Town of Eagle is a small mountain community of 6,400 people in Colorado. In recent years, the Town has focused on “complete streets” improvements in its downtown, including beautification and planting, linear parks, bike lanes, and managed on-street parking. Its downtown core is closely abutted by streets dominated by single-family residential homes. A behavior had formed among these residents that involved extensive, long-term storage of vehicles (including RVs and trailers) in the public right-of-way adjacent to their properties. This tendency was preventing the Town from successfully enacting parking management policies that would incite turnover, and inhibiting essential functions like street sweeping, snow removal, and utility work. While an ordinance on the books in Eagle prohibited private vehicle storage in the right-of-way for a period greater than 24 hours, the public was generally not aware of the ordinance, and it was not being enforced.

As a solution to these issues, the Town of Eagle implemented a pilot program including the following initiatives:

- A program website and social media updates, including general public parking information.
- A public meeting to discuss the ordinance and its importance.
- A 120-day enforcement of the vehicle storage ordinance.

Feedback on the pilot was collected via phone and e-mail through the Town’s Communication Center and through the Community Development Department.

Following the pilot and resident responses, the Town decided to make the pilot permanent in certain neighborhoods, with a ramp-up between November and April for snow removal.

Rapid City, South Dakota- Smart Parking Meters

Rapid City in South Dakota is home to roughly 65,000 residents, with high tourism activity due to its proximity to the Mount Rushmore National Memorial. Following a comprehensive parking study completed in 2018, the City moved forward with a summer pilot program of new paid parking technologies. Key components of the pilot included:

- Implementation in one of the downtown’s most well-used parking structures, the Main Street Square parking garage.
- Implementation during the summer, Rapid City’s busiest time for both local and tourism activity.
- A 60-day pilot allowing for users to test out four different parking payment technology options.
- Two public meetings, a project website, social media updates, and “walk-through videos” released by the Rapid City Police Department.
- An online survey tracking feedback on the various technology options and ease of use for each.

Feedback from this pilot resulted in general support from the community and a decision about which parking technology provided the highest level of service for users. Six months following completion of the pilot program in February 2019, City Council voted unanimously to move forward with purchasing a suite of one of the piloted parking meters, with installation finalized in summer 2019.

New York, New York- Cargo Bike Delivery

In an effort to improve street and curbside safety, enhance air quality, and reduce congestion, the City of New York announced a pilot partnership with several major delivery companies (including Amazon, DHL, and UPS, among others) for drivers to use cargo bikes instead of traditional delivery trucks. Key components of the pilot include:

- A six-month pilot focused on Manhattan’s most congested delivery networks (south of 60th Street).
- Deployment of a maximum total of 100 cargo bikes, all in place of delivery trucks or vehicles that would serve the same purpose.
- Safety and logistics requirements for companies participating in the deployment, including safety training for riders, ADA compliance, parking and overnight storage requirements, and a maximum speed limit of 12 miles per hour.
- Data collection and sharing requirements for participating companies.

Following the pilot (launched in December 2019), the City will use the data collected by the companies, including speed, parking usage, bike lane usage, and average size and length of the cargo bikes deployed, to evaluate how to best allocate curb space for cargo bikes in the future, and to what extent cargo bikes should replace delivery truck usage.

Technology

Technology may also be able to assist in the implementation of curb management strategies.

If the implementation of curb management strategies results in the loss of parking, parking wayfinding improvements may be provided in order to help drivers find available parking. This may be provided via Advanced Parking Guidance Signs (APGS), parking sensors, and mobile applications.

APGS signs have digital displays that show real-time parking availability. These signs may be erected at key decision points for drivers in order to direct them to available spaces.

Additionally, mobile apps and parking websites may be used to provide real-time parking availability for users. This allows parkers to look up parking availability in the area prior to arriving so they know exactly where they will likely find available parking. These technologies also have the opportunity to administer parking reservations which allows people to pay to park ahead of time and drive directly to the space.

Mobile apps may also be utilized for delivery drivers, providing information as to where available spaces are that allow short-term parking for deliveries.

Camera technology may also assist in managing the curb. Mounted cameras can assist with monitoring and counting pedestrians, parked vehicles, TNCs, bikers, and deliveries. This may help communities understand the volumes of different users which can help inform the types of curb management strategies implemented and to make adjustments as necessary. Camera technology can also enable third-party auditing of TNC pick-up and drop-off activities if and when a curb usage fee is established for these services.

ParkMobile—Dallas, Texas

The City of Dallas has partnered with ParkMobile since late 2016 to allow for parking customers to pay for their parking using the ParkMobile phone application. The service is available for over 4,500 parking spaces citywide. In addition to payments, the application allows for customers to receive alerts and add time to their parking session and is fully integrated with the City’s parking enforcement system.

Figure 24: Park Mobile Registration Instructions

Registration is Quick and Easy!

Set up your Parkmobile Account in Just a Few Simple Steps:

- 1** **Sign Up**
Once you have downloaded the app, you will be asked to fill out basic information. Or you may log in with Apple Touch ID.
- 2** **Complete Sign Up**
You have the option to continue with registration or explore the app and complete sign up at a later time.
- 3** **New Vehicle**
If you decide to complete registration, you will be asked to fill in your Licence Plate info. You can add up to 5 LPN's per account.
- 4** **Add Payment**
Next, you will be asked to choose a payment method. Please note that not all payment methods are accepted in all areas.

Source: Graphic c/o City of Dallas, 2020



04 Conclusion and Next Steps

Conclusion and Next Steps

Curb management is a diverse and essential planning practice for cities and towns of all sizes.

Demands for the curb are changing rapidly. A historically car-centric place, the curb is now a diverse hub of multiple transportation modes, business, and social activities. In smaller communities where parking and vehicle movement are still the primary functions of the curb, curb management is an essential planning tool to retain public access to the right-of-way and distinguish between private property and public property. In larger communities, curb management is integral to bringing order and value to this public space. Figure 25, below, depicts the different stages or “tiers” of curb management in a municipal setting. Table 3 outlines the recommended priorities for communities in each tier.

Figure 25: Curb Management Tiers



Table 3: Curb Management Tiers—Recommended Priorities

Tier (Shown on Figure 25)	Recommended Curb Management Priorities
1	<ol style="list-style-type: none"> 1. Creating physical distinction between private property and the public right-of-way (e.g. by installing sidewalk, curb, and gutter) 2. Monitoring community usage of curb space, with a focus on vehicle and equipment storage in the public right-of-way
2	<ol style="list-style-type: none"> 1. Developing ordinances regulating the use of the curb space (e.g. vehicle storage and abandonment or parking time limits). 2. Implementing these ordinances using regular enforcement. 3. Educating the community about these ordinances and their importance. 4. Continuing to monitor usage of curb space and identify challenge areas, e.g. through a parking study.
3	<ol style="list-style-type: none"> 1. Creating physical distinctions and barriers between the travelway and pedestrian space at the curb. 2. Continuing to monitor usage of curb space and identify challenge areas and areas of opportunity, e.g. through a parking and mobility study. 3. Identifying areas where delineation of modes, e.g. separated bike lanes or extended sidewalks, may be appropriate.
4	<ol style="list-style-type: none"> 1. Monitoring usage of space designated for certain travel modes, such as separated bike lanes. 2. Developing a prioritization policy for creating space for travel modes and activities 3. Conducting community outreach to assess qualitative needs and identify areas for additional curb management
5	<ol style="list-style-type: none"> 1. Creating a transportation demand management plan. 2. Collecting data on transit system usage and needs to appropriately allocate resources
6	<ol style="list-style-type: none"> 1. Setting a clear policy goal for parking pricing (e.g. balancing parking demands or encouraging the use of other transportation modes) 2. Monitoring parking revenues, particularly the impacts of other vehicle-based transportation usage on revenue totals (e.g. Uber or Lyft and commercial deliveries)
7	<ol style="list-style-type: none"> 1. Setting clear policies for regulation and use of newer modes of travel. 2. Monitoring the impacts of vehicle-based transportation usage on parking revenues 3. Identifying opportunities to monetize curb usage outside of on-street parking in order to recoup costs (e.g. e-scooter and e-bike fees, delivery permits, etc.)

There are many different treatments—both permanent and temporary—that communities can leverage for various transportation modes and priorities. Basic strategies may include improvements to the pedestrian realm, such as curb extensions, enforced and clearly-defined parking areas, and signed unloading zones. Advanced strategies might include permanent infrastructure for transit and bicycles, paid parking or parking management districts, and fees for commercial loading or Uber/Lyft activity. In applying curb management, it is essential to:

- **Decide where intervention makes sense.** Curb management serves the highest purpose when implemented in areas where different activities are competing for the same space. This could include a commercial area, a central business district, or a mixed-use retail and restaurant corridor.
- **Determine what you're trying to solve for, and where.** Communities should identify a core purpose or mission statement for the curb management solution. A great first step is a look at comprehensive planning documents—like a Transportation Master Plan—to identify broad priorities and goals in various land use contexts.
- **Gather both quantitative and qualitative data.** Communities should then conduct both quantitative and qualitative data collection to assess the needs within the identified area of focus. For example, communities might conduct intercept surveys to identify user challenges, and may collect on-the-ground counts of bus and transit activity, Uber and Lyft activity, and commercial loading activity.
- **Evaluate tradeoffs and align tradeoffs with priorities.** Tradeoffs should be evaluated in keeping with the modal priorities the community has set. For example, installation of a protected bike lane might impede speed of movement in the travelway among motorists, but if active modes have been prioritized in the focus area, this might be an appropriate and necessary tradeoff. Conversely, a commercial loading zone would increase ease of this business activity, but may pose a challenge if parking revenues are an essential priority and no revenue is generated from loading zone usage.
- **Continue to monitor treatments after they are selected and implemented.** Implementation of a treatment should not be the end of the process. Communities who have selected and implemented treatments should continue to monitor its success in accordance with the issues identified and priorities set. This should include both continual public outreach and education around the treatment, and ongoing opportunities for quantitative data collection to evaluate behaviors around the treatments and make changes if necessary.

With a tiered, contextual approach prioritized in accordance with broader planning and economic goals, every community can seize this moment and implement curb management.