

Greensboro Downtown Parking Plan

A Comprehensive Look at Greensboro's Downtown Parking System

Industry Best Practices Report



Prepared by: **Kimley»Horn**
Expect More. Experience Better.
June 2023

This Page Is Intentionally Blank

TABLE OF CONTENTS

Introduction	4
Summary of Conclusions	5
Off-street Parking Best Practices.....	7
Create a Quality Parking Experience	7
Limit Parking Expansion.....	9
Efficiently Utilize Existing Parking	11
Promote Multi-Modal Travel	13
Support EV Fleet Conversion and Growing EV Charging Demand	15
Curb Lane Management Best Practices.....	17
Set Curb Priorities based on Surrounding Land Uses.....	17
Diversify the Curb Lane with Non-Parking Uses.....	19
Shift from Parking Enforcement to Curb Lane Compliance	21
Explore Strategies that Enhance Curb Lane Efficiency	23
Incorporate Smart Loading Zones and Monetize Loading Zone Access.....	25

Introduction

The way parking is viewed in cities is shifting. Historically, parking was considered a necessary part of urban development. For each new building constructed, a required amount of parking was needed to ensure the land use could function. This approach avoided parking spillover and ensured drivers could conveniently find a parking space when needed. Over time, parking requirements began to unintentionally shape cities. To accommodate the required parking for a land use, developments provided surface parking lots that surrounded the building. Increased amounts of land dedicated to parking also increased the distance between land uses, making driving from location to location necessary. The proliferation of parking in our urban centers has created a legacy that cities are actively trying to undo.

As an industry, there are best practices in how cities approach off-street and on-street parking management. Although there is no one-size-fits-all approach to parking and curb lane management, there are widely accepted industry trends that should be incorporated into the Greensboro Department of Transportation's (GDOT) approach to developing a Downtown Parking Plan.

Off-street Parking Best Practices

1. Create a Quality Parking Experience
2. Limit Parking Expansion
3. Efficiently Utilize Existing Parking
4. Promote Multi-Modal Travel
5. Support EV Fleet Conversion and Growing EV Charging Demand

Curb Lane Management Best Practices

1. Set Curb Lane Priorities based on Surrounding Land Uses
2. Diversify the Curb Lane with Non-Parking Uses
3. Shift from Parking Enforcement to Curb Lane Compliance
4. Explore Strategies that Enhances Curb Lane Efficiency
5. Incorporate Smart Loading Zones and Monetize Loading Zone Access

These overarching trends will be explored in more detail and be the underpinning of a modern Greensboro parking system. Key trends for off-street and on-street parking make up the **"What"** for the Greensboro Downtown Parking Plan. The Plan seeks to align the City's Downtown public parking system with industry best practices and emerging trends. The **"Why"** of the Plan is to create a vibrant Downtown experience that attracts businesses, residents, customers, and visitors, leading to a Greater Greensboro. **How** parking contributes to a Greater Greensboro as well as the **Where, When, and Who** will be detailed in the final chapters of the Plan: **Parking System Rightsizing and Operations Plan**, and the **Curb Management Strategic Action Plan**. This chapter will focus on the key trends outlined above.

Summary of Conclusions

Table 1. Off-street Parking Industry Best Practices and Action Items Summary

Industry Best Practice	Summary	Action Items of an Industry-Leading Parking Program
Create a Quality Parking Experience	A customer's parking experience begins before a person leaves their home and ends when they exit the parking facility. To create a quality parking experience, operators should evaluate the services they offer from the customer's perspective during each segment of the parking experience: Planning, Entering, Navigating, Returning, and Exiting.	<p>Enhance online presence and create a website that is easy to navigate, informative, and provides accurate information.</p> <p>Install wayfinding signage along key routes that help drivers navigate to available public parking.</p> <p>Clearly designate public parking facilities with easily-identifiable signage and standard parking colors.</p> <p>Inform customers of a parking facility's availability before they enter the facility and ensure customers understand parking rates, rules, and regulations.</p> <p>Create internal wayfinding and signage that orient pedestrians to the parking facility and help pedestrians safely reach their destination.</p> <p>Enhance payment options for customers to create a frictionless parking experience.</p> <p>Improve signage and technology that helps customers find their vehicle at the end of their parking session.</p> <p>Ensure parking facilities are safe, secure, and actively monitored.</p> <p>Explore License Plate Recognition (LPR) Technology or other strategies to create frictionless vehicle exiting and minimize queuing.</p> <p>Leave a positive impression by thanking customers for parking at a public parking facility and regularly survey customers about their parking experience.</p>
Limit Parking Expansion	Cities across the country have been shifting towards decreasing the number of new parking spaces associated with development. Industry best practices are trending towards removing parking minimums, setting parking maximums, and requiring shared parking when possible.	<p>Set parking maximums for single-use parking facilities.</p> <p>Require shared parking studies and parking management plans for new developments and the creation of parking facilities.</p> <p>Limit the creation of surface parking lots within a 1/8-mile radius of city-owned parking facilities.</p>
Efficiently Utilize Existing Parking	To increase the use of existing parking facilities, cities can explore opportunities to diversify the types of permits sold, increase the user base by capturing additional parking demand, and generate additional demand by decreasing alternative parking options.	<p>Introduce employee daily parking permits.</p> <p>Advertise public parking facilities as the ideal parking location for retail and restaurant employees and customers.</p> <p>Incentivize the development community to plan developments near public parking facilities that have the capacity to absorb future parking demand.</p> <p>Shift user demand from existing surface parking lots to shared parking decks.</p> <p>Repurpose publicly owned surface lots to active uses.</p>
Promote Multi-Modal Travel	An emerging industry best practice for off-street parking is improving the connection between parking and other transportation modes. Cities are exploring opportunities to develop mobility hubs into their transportation system.	<p>Integrate mobility hubs into future parking design and retrofit existing parking facilities to support multi-modal travel.</p> <p>Expand technology offerings to include a single app (mobility wallet) that allows customers to pay for parking and transfer to transit, bike share, and other modes of travel. Technology options can also include mobile payment applications that allow remote parking session extensions and parking pre-booking.</p> <p>Enhance access to transit services that support a 'park once system'.</p>
Support EV Fleet Conversion and Growing EV Charging Demand	As cities prepare for growth in EV charging demand, implementing building code regulations that enhance EV readiness is critical. Cities across the country are adopting new building code requirements, or aligning with state and federal guidance, to expand EV charging infrastructure.	<p>Determine the type and quantity of electric vehicle charging equipment that meets the City's current and future charging needs and develop a comprehensive electric vehicle charging plan.</p> <p>Expand electric vehicle charging infrastructure for public use.</p>

Table 2. Curb Lane Management Industry Best Practices and Action Items Summary - Curb Management

Industry Best Practice	Summary	Action Items of an Industry-Leading Curb Lane Management Program
Set Curb Priorities based on Surrounding Land Uses	Curb lanes in an urban environment serve as a resource for surrounding land uses. Curbs should be prioritized to meet access needs of adjacent land uses and support a vibrant downtown environment. Ranking these curb priorities allows for the strategic allocation of curb space and a planned approach to determining tradeoffs between different curb uses.	Survey business owners and property managers annually to determine their curb lane needs.
		Rank priorities for curb lanes and corridors in urban settings to establish a hierarchy for future curb space allocation.
		Re-allocate curb space based on ranked priorities.
		Evaluate opportunities to flex curb lane uses by the time of day to satisfy the needs of adjacent land uses during the times when curb lane access is needed.
Diversity the Curb Lane with Non-Parking Uses	Creating a balanced and efficient curb lane ecosystem requires a mixture of curb uses. Cities are embracing a dynamic and flexible curb that provides equitable access for all users.	Explore peak period parking restrictions that flex the curb to non-travel lane uses during non-peak times.
		Implement parking management strategies that generate parking turnover and increase curb lane efficiency.
		Reallocate curb space to promote equity across modes by ensuring modes have access to the curb lane based on user demand.
		Ensure the quantity, placement, and design of ADA parking spaces and loading zones are meeting demand.
		Expand the loading zone network to meet growing passenger and goods and service loading demand.
		Safely enhance curb spaces dedicated to public activation.
Shift from Parking Enforcement to Curb Lane Compliance	Modern parking and curb lane management systems have shifted their focus from parking enforcement to curb lane compliance. Rather than relying on the issuance of citations to penalize users, cities are actively engaging with customers to ensure they understand the rules and regulations that govern the curb. This is accomplished by taking an ambassador approach to enforcement, offering multiple ways to comply with curb lane regulations, and using technology that supports accurate and efficient curb management.	Train parking compliance staff to use an ambassadorial approach to managing the curb lane system.
		Inventory and update curb lane signage to ensure it accurately reflects the city's desired curb operations.
		Provide multiple payment options that allow customers to easily pay for parking access, obtain permits for loading zone access, and navigate the curb lane system.
		Incorporate mobile app payment signage on street poles to allow customers to see the zone number and available payment options from their vehicle.
		Develop curb lane compliance routes and consistently evaluate compliance using mobile LPR technology.
		Integrate LPR technology with the back-office management platform to increase the accuracy of plate checks and parking rights evaluation.
		Incorporate objective metrics for parking compliance activity, such as the number of license plate reads, and avoid using citation issuance as a metric for system performance.
		Require at least three (3) photos documenting a vehicle in non-compliance as a part of the citation issuance process.
Enhance Curb Lane Efficiency	To enhance curb lane efficiency, cities are incorporating pricing and management strategies that promote parking turnover and distribute parking demand. Determining the appropriate pricing strategy to promote a desired parking behavior requires an understanding of different pricing methods.	Routinely evaluate curb lane and parking occupancy and duration.
		Set standardized performance thresholds for time-limited and metered parking.
		Designate metered parking based on observed parking behavior.
		Explore performance-based pricing strategies and determine what pricing strategies best meet Downtown user needs.
Incorporate Smart Loading Zones and Monetize Loading Zone Access	Managing loading zones through technology solutions is an emerging best practice in the parking and curb lane management industry. Smart loading zones vary based on the type of technology implemented and the desire to provide a frictionless loading zone experience.	Develop and adopt commercial delivery loading zone policy to require loading zone permits.
		Release a Request for Information (RFI) to obtain details on technology offerings for smart loading zones.
		Create an open data platform that communicates the location of loading zones and regulations for loading zone management to end users.
		Launch a smart loading zone pilot to monitor the use of loading zones and evaluate the technology's ability to accurately perform automated payments, invoicing, and compliance monitoring.

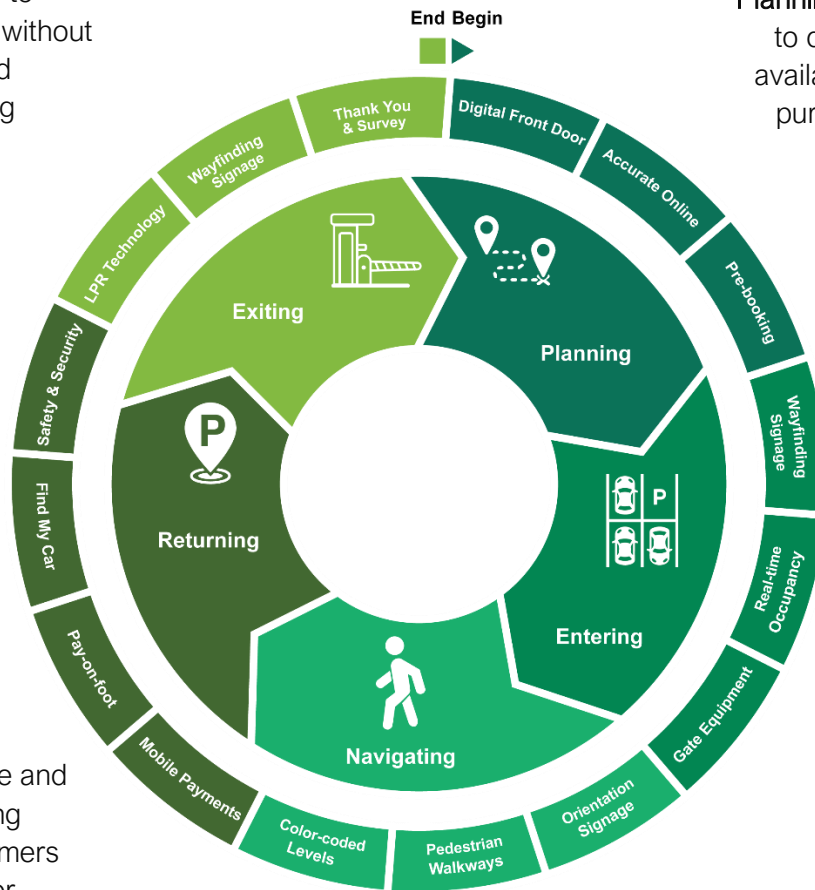
Off-street Parking Best Practices

Create a Quality Parking Experience

Although creating a quality parking experience has always been a focus for the parking industry, the methods used to shape a parking experience have evolved. A customer's parking experience no longer begins with being flagged into a parking facility. Now the customer experience begins before a person leaves their home and ends when they exit the parking facility. To create a quality parking experience, operators should evaluate the services they offer from the customer's perspective during each segment of the parking experience: Planning, Entering, Navigating, Returning, and Exiting, **Figure 1**.

Exiting allows customers to leave the parking facility without queuing or confusion and creates a positive parking experience.

Planning should allow customers to determine where parking is available and how to reserve or purchase their parking before they arrive at the facility.



Returning provides a safe and seamless end to a parking session and offers customers multiple options to pay for parking.

Entering focuses on creating an easy way for customers to identify the facility and begin their parking session.

Navigating helps customers safely move from their vehicle to their destination.

Figure 1. Creating a Quality Parking Experience

Impact on Downtown Greensboro

In Downtown Greensboro, there are opportunities for improvement in each phase of the customer parking experience. Industry-leading parking programs implement these action items:

- Enhance online presence and create a website that is easy to navigate, informative, and provides accurate information.
- Install wayfinding signage along key routes that help drivers navigate to available public parking.
- Clearly designate public parking facilities with easy-to-read signage and standard parking colors
- Inform customers of a parking facility's availability before they enter the facility and ensure customers understand parking rates, rules, and regulations.
- Create internal wayfinding and signage that orient pedestrians to the parking facility and help pedestrians safely reach their destination.
- Enhance payment options for customers to create a frictionless parking experience.
- Improve signage and technology that helps customers find their vehicle at the end of their parking session.
- Ensure parking facilities are safe, secure, and actively monitored.
- Explore License Plate Recognition (LPR) Technology or other strategies to create frictionless vehicle exiting and minimize queuing.
- Leave a positive impression by thanking customers for parking at a public parking facility and survey customers about their parking experience.

Aligning GDOT's parking facilities with industry-leading parking programs can enhance the customer parking experience, encourage repeat customers, decrease congestion, improve revenue generation, and support multi-modal travel.

Limit Parking Expansion

Cities across the country have been shifting toward decreasing the number of new parking spaces created with development. Major trends associated with this overarching goal are removing parking minimums, setting parking maximums, and requiring the sharing of parking spaces when possible.



Parking Minimums

By removing parking minimums, cities can decrease the false floor created by providing a minimum number of spaces for each new development. This allows cities to promote in-fill developments or support the conversion of older buildings to modern uses without building additional parking.



Parking Maximums

By setting parking maximums, cities cap the total number of new parking spaces developers can build with new developments. Setting parking maximums prompts developers to think critically about the need for parking spaces and assess the feasibility of leasing retail, residential, or office space with lower parking rates than typical tenant lease agreements. Parking maximums also encourage the use of alternative modes of transportation.



Shared Parking

Shared parking leverages changes in parking demand by time of day to maximize the use of parking over the course of the day. Rather than building the maximum parking supply for each land use in a mixed-use development, shared parking allows developers to build less parking while optimizing the use of the parking spaces that are built. Shared parking can also occur across sites where the existing parking supply is underutilized, allowing less parking to be built in a district.

When creating a new development, parking can add significant costs. Typical construction costs associated with surface parking range from \$3,500 to \$7,000 per space and [\\$25,000 to \\$35,000 per space](#) in above-ground structured parking decks. Minimum parking requirements can limit the feasibility of creating new developments, in particular affordable housing, by increasing the cost of construction, whereas maximum parking limits can challenge the success of planned developments by limiting the pool of potential tenants. Sharing parking across land uses and requiring developers to conduct a shared parking analysis as a part of the development process can help support economic development while limiting the creation of new parking spaces. A shared parking analysis helps developers create an optimized parking management plan and identifies potential needs for variations to parking minimums or maximums. Requiring shared parking is typically limited to overlay areas with multi-modal transportation options or high-density areas.


Impact on Downtown Greensboro

Minimum and maximum parking requirements are currently not a part of the City of Greensboro's zoning requirements for the central business district. This has led developers to rely on the City of Greensboro to build a parking supply that can meet their parking needs. Even so, market conditions and development financing requirements have led to a proliferation of parking Downtown that has gone unchecked. As seen in the **Existing Conditions Report**, 153 acres (36%) of land in Downtown Greensboro is used to provide parking. Because Greensboro's municipal code is silent on parking regulations in the central business district, developers are free to build parking as they see fit. To meet their parking demand and minimize construction costs, developers in Downtown Greensboro have primarily constructed surface parking lots. Aligning Greensboro's approach to limiting parking expansion with industry-leading parking programs can create additional opportunities for increased density and activation. Industry-leading parking programs implement the following items:

- Set parking maximums for single-use parking facilities
- Require shared parking studies and parking management plans for new developments and the creation of new public or private parking facilities
- Limit the creation of surface parking lots within a 1/8-mile radius of city-owned parking facilities
- Repurpose publicly owned surface parking lots for more active uses

Efficiently Utilize Existing Parking

Making the most of existing parking facilities is part of a successful parking plan. Efficiently using a city’s existing parking supply helps to ensure that previous investments in parking facilities create a return on investment, thereby limiting parking’s drain on a city’s general fund. To increase the use of existing parking facilities and generate additional revenue, cities are exploring opportunities to diversify the types of permits sold, increase the user base by capturing additional parking demand, and generate additional demand by decreasing alternative parking options.

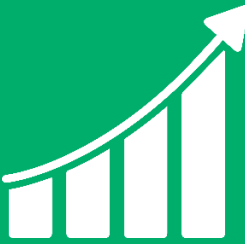


Offer Flexible Permits

To adapt to [parking demand in a post-pandemic world](#), parking operators have shifted towards offering daily parking permits. This allows employees to purchase parking on-demand rather than having the sunk cost associated with monthly permits that no longer match their needs.


Cities also offer pooled/shared permits in which a tenant has access to a maximum number of spaces. If user parking demand exceeds the maximum threshold, the tenant is charged the transient rate until user demand falls below the threshold. This allows tenants to purchase access to fewer spaces while also accommodating parking demand that exceeds their leased space count.

Although flexible permits increase the affordability of parking for employees, they can decrease the permit revenue generation potential at a parking facility.



Increase User Base

Parking facilities that have traditionally focused on adjacent office land uses will need to refocus demand from retail, restaurant, and residential land uses. To ensure the parking facility is attractive to transient parkers, parking operators are incorporating technology that informs customers about availability, providing safe and secure overnight parking for residents, and promoting public parking facilities as the first choice for parking.



Promote Park Once

Generating additional demand by decreasing alternative parking options requires a shift in the way cities approach accessory parking lots. Rather than relying on the outdated concept that each land use must provide enough parking to meet its individual demand, cities are exploring options to source parking from a common parking supply and promote a ‘park once’ experience by encouraging in-fill developments that create horizontal density, improve walkability, and activate street frontage.

Impact on Downtown Greensboro

The Downtown public parking system has experienced a major downturn in total day-time employee parking demand. Parking facilities that were previously used by office employees now have a less predictable user base, resulting in decreased parking demand. Coordination with major office tenants is needed to determine further plans for returning to the office. Similarly, additional coordination with downtown employees is needed to determine their parking demand. Industry-leading parking programs typically perform the following action items:

- Introduce daily parking permits for employees
- Advertise public parking facilities as the ideal parking location for retail and restaurant employees and customers
- Incentivize the development community to plan developments near public parking facilities that have the capacity to absorb future parking demand
- Shift user demand from existing surface parking lots to shared parking decks
- Repurpose publicly owned surface lots to active uses

Promote Multi-Modal Travel

An emerging industry best practice for off-street parking is improving the connection between parking and other modes of transportation. Cities are exploring opportunities to develop mobility hubs into their transportation systems. [Mobility hubs](#) are places in a community that brings together public transit, bike share, car share, and other ways for people to get where they want to go without a private vehicle. Although mobility hubs are traditionally built around frequent and high-capacity transit, public parking facilities are being adapted to serve as multi-modal connection points. By adding amenities such as bike share and scooter stations, secured bicycle parking, transit stops, and rideshare pick-up/drop-off zones, parking facilities can connect people to destinations beyond a parking spot. Mobility hubs can be scaled to meet a range of mobility options and should reflect the local needs of a city. Embracing a mobility hub approach to parking facility design and management also helps to promote a park once experience. Rather than moving a vehicle and parking at each destination, commuters can park in a city-owned public parking facility, connect to other modes of transportation, and access all that Downtown has to offer.



Figure 2. Mobility Hub Design Example

Another emerging best practice in the parking and mobility industry is the exploration of mobility wallets. Mobility wallets provide a single source of payment across multiple parking and mobility options. Using mobility wallets, customers can pay for transit passes, bike share, scooter access, and other modes of transportation. As defined by the Intelligent Transportation Society of America,

[Mobility Wallets](#) refer to an electronic or card-based payment tool/system, potentially applicable to both public and private shared transportation services, that helps to facilitate multi-modal mobility. A Mobility Wallet is a token or tool that provides users with access to rides, passes, best fares, and/or personalized credits. This token or tool can be utilized by riders to make trip payment easier and more seamless across a range of mobility options, modes, and carriers.

As parking operators embrace new technology and integrate with mobility options, mobility wallets can serve as the connective tissue between driving, parking, and accessing alternative modes of travel.

Impact on Downtown Greensboro

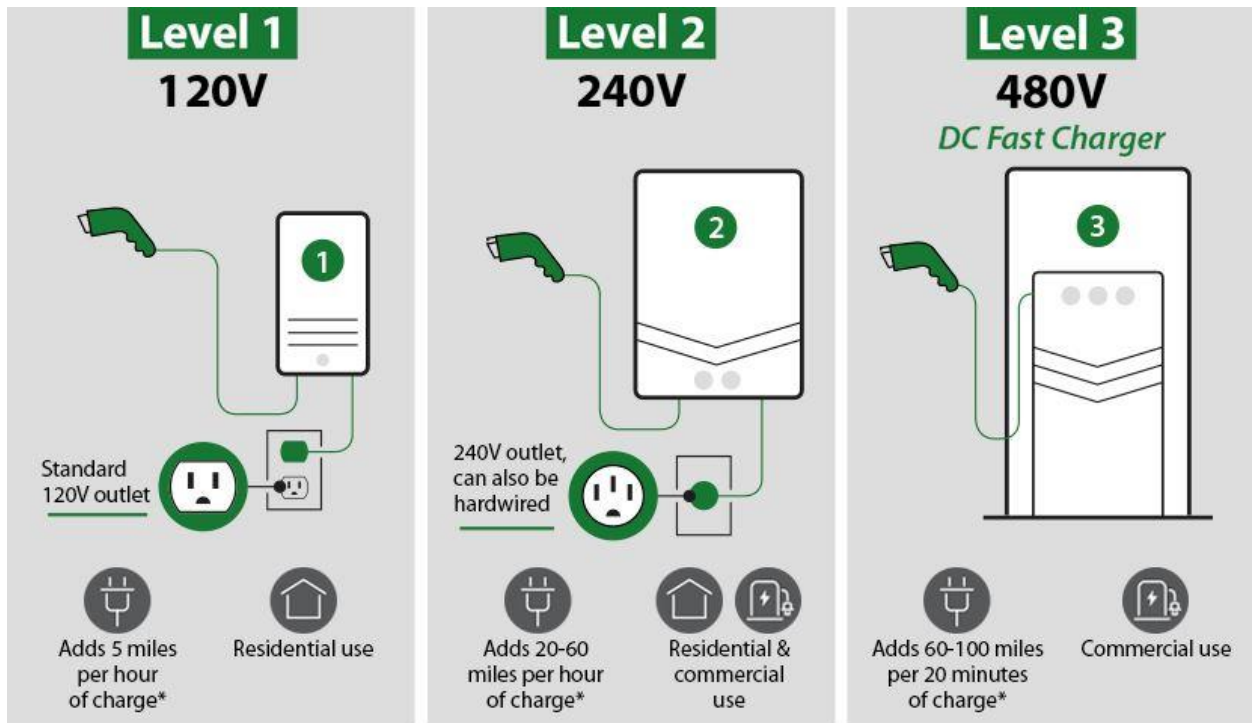
As GDOT continues to integrate technology into the Downtown public parking system, exploring technology such as mobility wallets can help to enhance seamless travel options and improve the customer experience. Connecting off-street parking with mobile payment applications can also help give parkers payment options such as extending their parking sessions remotely, pre-booking parking for seamless entry and exit, and ticket takeover options to avoid interacting with parking access and revenue control systems (PARCS) equipment. In the Downtown, Greensboro Transit Agency (GTA) offers 21 bus routes that enhance mobility and access throughout the city. To support a park once ecosystem, GDOT should explore opportunities to fully integrate the parking and transit systems. Embracing the mobility hub approach to parking design and using mobility wallets or alternative forms of trip transfers, parkers can access transit, bike share, and scooter options. This will expand customers' transportation options and support GDOT's mission to provide safe, seamless, and equitable transportation choices. Industry-leading parking programs typically perform the following action items:

- Integrate mobility hubs into future parking design and retrofit existing parking facilities to support multi-modal travel
- Expand technology offerings to include a single app (mobility wallet) that allows customers to pay for parking and transfer to transit, bike share, or other modes of travel. Technology offerings can also include mobile payment apps, remote parking extensions, pre-booking, and ticket takeover
- Enhance access to transit services that support a 'park once system'

Support EV Fleet Conversion and Growing EV Charging Demand

As our transportation system electrifies, there is an ongoing debate in the parking industry as to whether [parking decks will be the gas stations of the future](#), and what role parking facilities should play in electric vehicle (EV) Fleet Conversion and EV charging. A facility's parking demand profile will play a significant role in determining whether it makes sense to invest in electric vehicle charging equipment and at what scale equipment should be deployed. Additionally, if cities want to bolster the feasibility of electric vehicle adoption, providing public access to EV charging infrastructure when it's not in use by city-owned vehicles can be a helpful step in the process of EV adoption.

Understanding EV charging is critical for developing an EV ecosystem that can support the city's current and future needs. EV charging is the process of using electric vehicle charging equipment to deliver electricity to the car's battery. An EV charging station taps into the electrical grid to charge an EV. The technical term for EV charging stations is electric vehicle supply equipment (EVSE). According to the Society of Automotive Engineers, there are three levels of EV charging Level 1, 2, and 3, **Figure 3**.



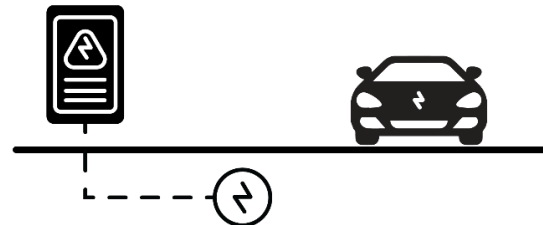
** Estimated. Actual charge times may vary.*

Figure 3. EV Charging Levels - [Eugene, OR](#)

Additionally, as cities prepare for growth in EV charging demand, implementing building code regulations that enhance EV readiness is critical. Cities across the country are adopting new building code requirements, or aligning with state and federal guidance, to expand EV charging infrastructure. These requirements typically call for a graduated level of EV readiness that spans three categories: EV Capable, EV Ready, and EV Installed, **Figure 4**.

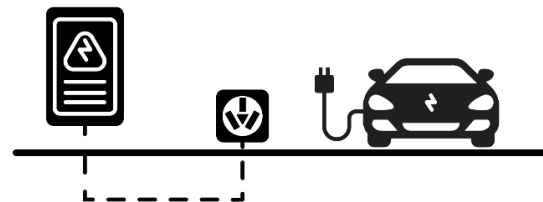
EV Capable

Install electrical panel capacity with a dedicated branch circuit and continuous raceway from the panel to the future EV parking spot.



EVSE-Ready Outlet

Install electrical panel capacity and raceway with conduit to terminate in a junction box or 240-volt charging outlet (typical clothing dryer outlet).



EVSE-Installed

Install a minimum number of Level 2 or Level 3 EV charging stations.

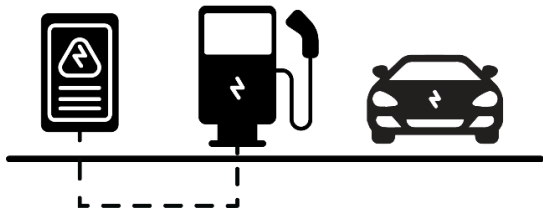


Figure 4. Electric Vehicle Capability Levels

Impact on Downtown Greensboro

The Downtown Greensboro public parking system has been expanding its offering of EV charging. Currently, there are six (6) EV charging stations in the Downtown Greensboro public parking systems, with four at the Eugene Street Deck and two at the Federal Place/Washington Street Lot. GDOT uses ChargePoint chargers to provide EV charging at these facilities. Based on the GSO 2040 Plan, the future of EV charging in Greensboro is not well defined. However, the plan’s push toward sustainability indicates that EV charging infrastructure is a tool that should be explored. Additionally, the Greensboro Urban Area Metropolitan Planning Organization is working with the City of Greensboro to evaluate the need for electric vehicle charging infrastructure and develop a plan for Greensboro’s approach to EV charging.

The GSO 2040 Plan highlights Prioritizing Sustainability as a big idea. Goal A states: Greensboro advances environmental stewardship, taking care of our natural resources and the natural systems that support all living things. Furthermore, Strategy 2 states: Take policy and program actions that advance sustainability. Such actions may include promoting green infrastructure to manage water quality, tree planting policies to reduce the urban heat island effect, development programs to increase recycling and reduce solid waste production, and policies to reduce air pollution and greenhouse gases. Stay up-to-date on emerging technologies and advancements in science that may contribute to increased sustainability.

Industry-leading parking programs typically implement the following items:

- Determine the type and quantity of electric vehicle charging infrastructure that meets the City’s current and future charging needs and develop a comprehensive electric vehicle charging plan
- Expand EV charging infrastructure for public use

Curb Lane Management Best Practices

Set Curb Priorities based on Surrounding Land Uses

Curb lanes in an urban environment serve as a resource for the surrounding land uses. As such, the priorities a city sets for curb lanes shape a curb's ability to meet the needs of land uses and support a vibrant downtown environment. Establishing curb priorities typically occurs at the corridor level and is refined at the block level to ensure the curb is equipped to meet user demand. This approach to curb management has transformed curbs from areas predominately for on-street parking to flexible spaces that can meet an array of user needs. Establishing the priorities for a curb allows for the strategic allocation of curb space and a planned approach to determining tradeoffs between different curb uses.

 <p>Access for People</p>	<p>People arrive at their destination or transfer between different modes of transportation</p>
 <p>Access for Goods</p>	<p>Goods and services reach customers and markets</p>
 <p>Public Space</p>	<p>Offers vibrant social spaces and enhances aesthetics and environmental health</p>
 <p>Storage</p>	<p>Provides storage for vehicles or equipment</p>
 <p>Mobility</p>	<p>Moves people and goods</p>

Impact on Downtown Greensboro

In Downtown Greensboro, priorities for curb lanes have not been well defined. Curb lanes have historically been comprised of static uses that are not connected to broader parking and mobility goals. GDOT has begun to embrace a modern approach to curb lane management in which curb uses are connected to the needs of the land uses they serve. Curbs adjacent to restaurants and retail land uses should have curb lanes with a mixture of priorities, such as access for goods and access for people. Alternatively, curb lanes adjacent to office or residential land uses may prioritize access for people and storage of vehicles.

Industry-leading parking programs typically implement the following items:

- Survey business owners and property managers annually to determine their curb lane needs
- Rank priorities for curb lanes and corridors in urban settings to establish a hierarchy for future curb space allocation
- Identify curb uses that align with established curb priorities to develop an implementable approach to curb lane management
- Evaluate opportunities to flex curb lane uses by the time of day to satisfy the needs of adjacent land uses during the times when curb lane access is needed

Diversify the Curb Lane with Non-Parking Uses

Creating a balanced and efficient curb lane ecosystem requires a mixture of uses at the curb. In cities, space at the curb is highly sought after. Competing priorities for curb space can lead to congestion and unsafe conditions for vehicles, cyclists, and pedestrians. This is typically demonstrated by the conflict between using curb space for on-street parking and dedicating curb space for non-parking uses. An industry best practice in curb management is to allocate curb space based on defined priorities. Cities are embracing the reality that the curb cannot be dedicated to a single user group. Rather, the curb must provide equitable access for all users. To accomplish this goal, cities have developed five categories for curb space allocation and identified curb uses that fall within each category, **Figure 5**.

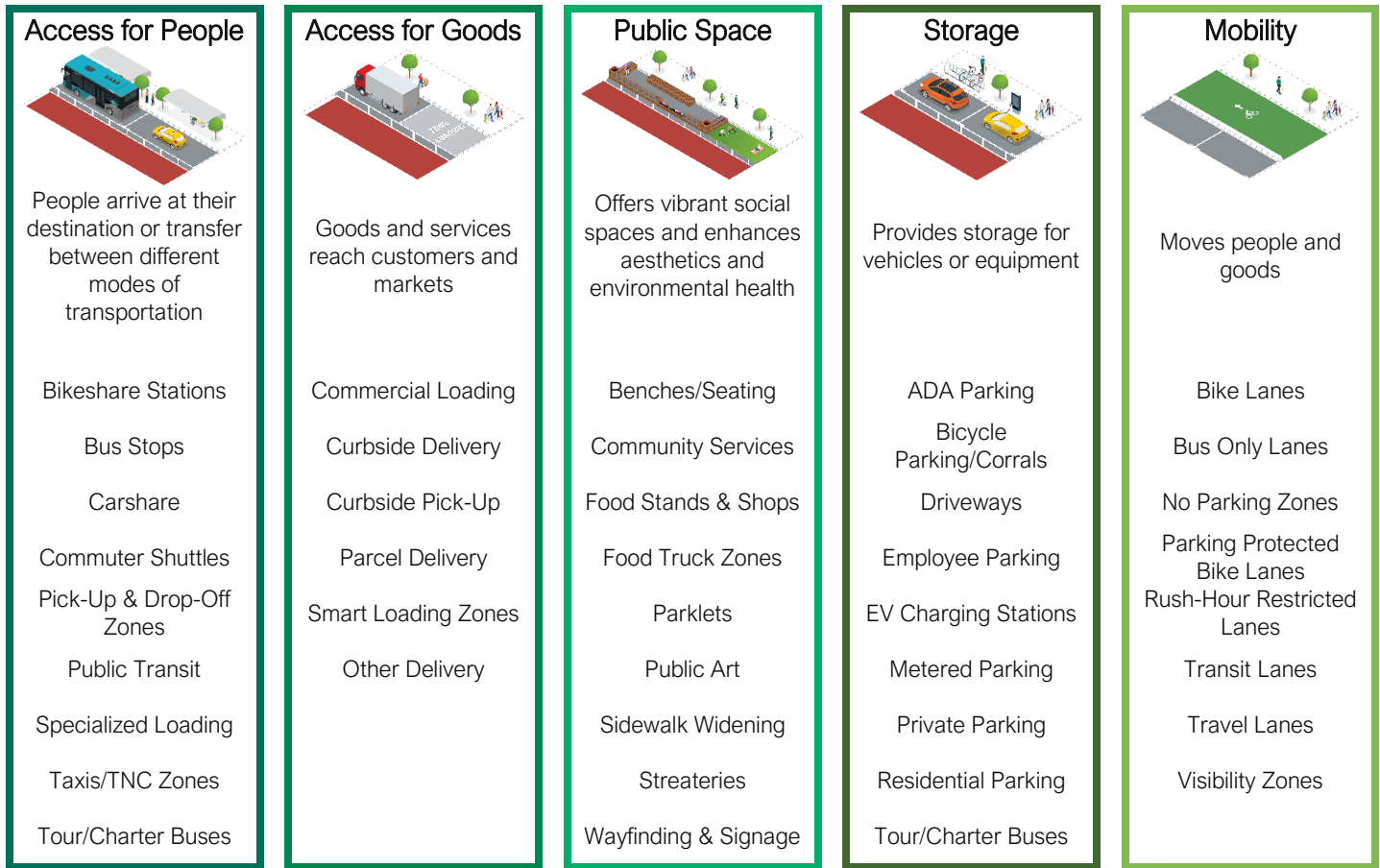


Figure 5. Curb Use Priorities and Use Types

Evaluating existing curb uses and diversifying curb lanes based on goals for equity, efficiency, and economic development allows cities to determine how to get the most out of limited curb space. When allocating curb space, it's important to keep in mind that not all curb uses can physically fit on the same block face, and curb uses may need to be allocated around the corner or on a nearby block face to meet to satisfy the demand by competing uses.

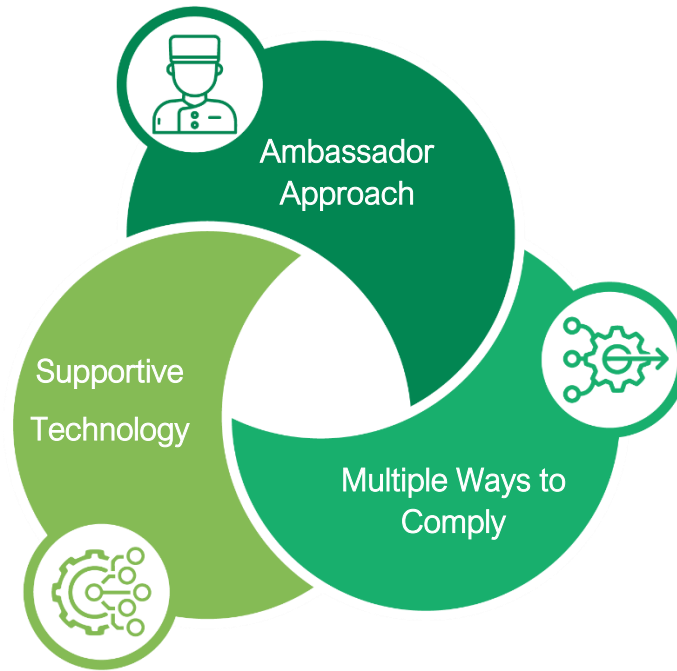
Impact on Downtown Greensboro

Currently, mobility dominates the curb lanes in Downtown Greensboro, with **65%** of curb lanes are being used as no-parking zones, transit lanes, or travel lanes. Additionally, vehicle storage is the second dominant curb use, consuming **29%** of curb lane space. Access for People, Access for Goods, and Public Space is limited to **6%** of the curb lanes in Downtown Greensboro. As GDOT evaluates its curb performance, reallocating curb space will be a critical step in enhancing access for all. To diversify the curb lane with non-parking uses, industry-leading parking programs typically implement the following items:

- Explore rush-hour parking restrictions that flex the curb to other curb uses during non-peak travel times
- Implement parking management strategies that generate parking turnover and increase the efficiency of curb lanes
- Reallocate curb space to promote equity across modes by ensuring modes have access to the curb lane based on user demand
- Ensure the ADA parking system is sufficient to meet the demand for ADA parking and meets established standards
- Expand the loading zone network to meet growing passenger and goods and service loading demand
- Enhance spaces dedicated to public activation and ensure they operate safely
- Assess traffic volumes along corridors to determine where there is excess roadway capacity and evaluate the feasibility of performing road diets

Shift from Parking Enforcement to Curb Lane Compliance

Modern curb lane management systems have shifted their focus from parking enforcement to curb lane compliance. Rather than relying on the issuance of citations to penalize infractions, cities are actively engaging with customers to ensure they understand the rules and regulations that govern the curb to support a parking system that supports the city's overarching goals.



By taking an ambassador approach to curb lane compliance, cities have reassigned parking enforcement staff to serve as a guide that helps customers navigate the parking system. A well-trained and friendly parking compliance staff can serve as a positive first and last impression for people visiting and parking downtown. In addition to managing the curb, parking compliance staff can help customers and visitors find their destination and stay aware of activities and events in the downtown area.

In addition to taking an ambassador approach, cities increase parking compliance by providing customers with multiple payment options, ensuring meters are operational and easy to use, and routinely updating parking signage to reflect curb lane conditions. This gives customers multiple opportunities to comply with regulations, understand the curb lane landscape, and avoid getting a citation.

As cities shift from parking enforcement to parking compliance, they temper their use of technology with updated protocols for citation issuance. When using LPR technology to check vehicle license plates for compliance, cities require multiple queries of the back-office management platform to verify a vehicle's parking rights. Additionally, rather than setting quotas for citation issues, cities use objective performance metrics such as the number of license plate reads or the number of monitoring routes completed to measure compliance staff activity. Cities have also increased the standard of accuracy for citation issuance by requiring that at least three (3) photos of a vehicle in violation of a parking regulation before a citation can be issued. Lastly, cities provide a transparent online adjudication process that allows customers to contest parking citations, see the evidence associated with a violation, and receive a determination of their appeal through an administrative review or remote adjudication hearing.

Impact on Downtown Greensboro

Parking and curb lane management compliance Downtown is low, leading to unsafe conditions, increased congestion, and unproductive public right of way. Due to outdated parking technology, unclear signage, and inconsistent accountability, Downtown parkers have developed a culture of non-compliance. As GDOT begins to manage Downtown curb lanes, there will likely be resistance to changing parking behavior and complying with the rules and regulations that make up an efficient curb lane system. To shift from parking enforcement to parking compliance, industry-leading parking programs typically implement the following items:

- Train parking compliance staff to use an ambassador approach to managing the curb lane system
- Inventory and update curb lane signage to ensure it accurately reflects the city's desired curb operations
- Provide multiple payment options that allow customers to easily pay for parking access, obtain permits for loading zone access, and navigate the Downtown curb lane system
- Incorporate mobile app payment signage on street poles to allow customers to see the zone number and available payment options from their vehicle
- Develop curb lane compliance routes and consistently evaluate compliance using mobile LPR technology
- Integrate LPR technology with the back-office management platform to increase the accuracy of plate checks and parking rights evaluation
- Incorporate objective metrics for parking compliance activity, such as the number of license plate reads, and avoid using citation issuance as a metric for system performance
- Require at least three (3) photos documenting a vehicle in non-compliance as a part of the citation issuance process
- Ensure the citation appeal process is easy to navigate, allows for online appeals, and provides a timely response to citation appeals

Explore Strategies that Enhance Curb Lane Efficiency

To enhance curb lane efficiency, cities are incorporating pricing and management strategies that promote parking turnover and distribute parking demand. Determining the appropriate pricing strategy to promote a desired parking behavior requires an understanding of different pricing methods,

Table 3.

Table 3. Pricing Strategies for Curb Lane Efficiency

Pricing Strategy	Desired Outcome	Ideal Conditions	Unintended Consequences
Free Parking, without time limits	Long-term Parking (4 hours or more)	Areas with low parking demand and no commercial uses	Employees parking in primarily residential areas
Free Parking, with time limits	Mid-term Parking (2 – 4 hours)	Areas with <50% parking demand and limited commercial uses	Parkers may not know when they reach the maximum time limit, resulting in citations
Uniform Rate	Short-term Parking (2 hours or less) Paid parking with turnover based on user need or maximum time limit	Areas with >50% parking demand and commercial uses	Static pricing may not reflect the demand for parking, resulting in over-congested areas, double parking, or cruising for parking
Dynamic Pricing	Short-term Parking (2 hours or less) Distribute parking demand from high-demand areas to low-demand areas	A grid system that allows users to shift their parking location from high-demand areas to moderate or low-demand areas	Confusion about the price of parking in an area
Zone-based Pricing	Short-term Parking (2 hours or less) Charge higher rates in high-demand areas and lower rates in low-demand areas, but not at a block-by-block level	Clearly defined area boundaries, such as Downtown and non-Downtown areas or at the neighborhood level	Equity concerns that areas of high demand are for the exclusive use of people who can afford it Confusion about the price of parking in an area
Tiered Pricing	Short-, Mid-, or Long-Term Parking Generate turnover by price in areas with extended or no maximum time limits	Areas with smart meters or mobile payment areas that can track parking sessions by license plate	The cost of an on-street parking session can be expensive for parkers that don't understand the rules of tiered pricing

Impact on Downtown Greensboro






On-street parking Downtown consists of a mixture of free parking, with and without time limits, and metered parking using a uniform rate system of \$1.00 per hour. The hours of operation for metered parking are Monday – Friday, 8:00 AM – 6:00 PM. The location and hours of operation of free or metered parking are not based on parking demand. Based on observed parking behavior, parking demand was highest on Elm Street, where parking is free with a two-hour time limit. Conversely, on side streets near Elm Street, such as E Washington Street, W Market Street, and W Friendly Avenue, parking is metered even though the demand for parking is lower. This mismatch of parking demand to pricing results in high-demand areas being used for long-term parking rather than providing an efficient curb lane system that generates parking turnover. To enhance curb lane efficiency, industry-leading parking programs typically implement the following items:

- Routinely evaluate parking occupancy and duration for curb lanes
- Set standardized performance thresholds for time-limited parking and metered parking
- Designate metered parking based on observed parking behavior
- Explore performance-based pricing strategies and determine which pricing strategies best meet Downtown user needs

Incorporate Smart Loading Zones and Monetize Loading Zone Access

Managing loading zones through technology solutions is an emerging trend in the curb lane management industry. Loading zones are established to designate strategic short-term stopping zones within the curb and flex space for trucks and commercial vehicles. Loading zones are placed adjacent to high-volume and high-demand businesses to ensure close and frictionless loading experiences. By incorporating technology such as open data sources or camera sensors, cities are equipping their curb with Smart Loading Zones. Smart Loading Zones are similar to traditional loading zones but are equipped with technology that communicates the availability/occupancy of a loading zone, tracks the usage of a loading zone by user or company type, monitors the duration of loading zone activity, and seamlessly charges users for their loading zone activity. Smart Loading Zones vary based on the type of technology implemented and the desire to provide a frictionless loading zone experience. Technology solutions for Smart Loading Zones vary in their capability to manage loading needs. When selecting a technology solution, it’s important to have a full understanding of its capabilities to ensure the implemented technology results in the desired outcome. **Table 4** provides a comparison of loading zone technologies based on their capabilities and can serve as a reference tool for Smart Loading Zone technology comparison.

Table 4. Smart Loading Zone Technology Comparison

Features	Technology Type				
	 Mobile App Loading	 RFID	 In-ground Sensor	 Open-Source Data	 Camera Sensors
Automated User Check-in					
Loading Zone Booking					
Loading Zone-Specific Occupancy Detection					
General Curbside Loading Detection					
Duration Tracking					
Automated Enforcement					
Automated Payments & Invoicing					
Captures Non-permitted Users					
Requires Legislation Change					
OVERALL RATING	4 out of 9	4 out of 9	3 out of 9	4 out of 9	7 out of 9

As seen in **Table 4**, camera sensor technology includes 7 out of 9 smart loading zone features, whereas in-ground sensors only includes 3 out of 9. Determining a city’s loading zones needs is essential to selecting the appropriate technology type.

Impact on Downtown Greensboro

In Downtown Greensboro, there are approximately 57 loading or curbside delivery zones. These zones are predominately along the Elm Street, Greene Street, Friendly Avenue, and Market Street corridors. Management of loading and curb delivery zones is based on adherence to loading zone signage. The usage of loading zones is not routinely monitored, and GDOT does not limit access to loading zones exclusively to permitted users. To incorporate smart loading zones and monetize loading zone activity, industry-leading parking programs typically implement the following items:

- Develop and adopt commercial delivery loading zone policy to require loading zone permits
- Release a Request for Information (RFI) to obtain details on technology offerings for smart loading zones
- Create an open data platform that communicates the location of loading zones and regulations for loading zone management
- Launch a smart loading zone pilot to monitor the use of loading zones and can evaluate the technology's ability to accurately perform automated payments, invoicing, and compliance monitoring