TDM Plan Appendices

Transportation Demand Management Study

City of Traverse City

NELSON NYGAARD

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EVENING METERING

Following is a survey of municipalities that have extended curbside meter schedules into evening hours to create more-consistent parking availability in support of commercial activity at these times. A set of case studies is presented, followed by a very partial list of cities that have extended meter hours past 6PM, reflecting both a national shift toward evening-based activity among commercial-center economies, and a renewed focus on pricing to manage curbside demand/availability during peak-demand periods.

SEATTLE, WA

In 2010, the City of Seattle initiated a performance-based pricing program to better manage the city's on-street parking resources. Since initiating this program the Seattle Department of Transportation (SDOT) has periodically extended enforcement of metered spaces from 6:00 p.m. to 8:00 p.m. in certain areas to increase the availability of parking spaces in the evening. Currently, the city enforces parking until 8:00 p.m. in 18 of the 33 neighborhood areas that have metered on-street parking. The areas with extended enforcement are spread across the city, with many located far from the City Center area.

In 2014, the city extended metered rate enforcement hours in neighborhood areas with growing commercial activity. The results of the City's 2015 Annual Parking Study show that between 2014 and 2015 the enforcement extensions had the intended results.

Figure 1   Parking occupancy changes in extended enforcement areas 2014-2015

Neighborhood Area	Parking Occupancy (7PM)	
	2014	2015
Fremont (Core)	95%	88%
Cherry Hill	95%	70%

HUNTINGTON VILLAGE, LONG ISLAND

In 2014, the Township of Huntington, NY created tiered on-street parking rates within Huntington Village, its downtown district, to increase availability along its primary commercial streets — New York Avenue and Main Street. They also shifted the schedule of meter enforcement to cover both the midday and evening peak periods, when on-street availability had been most-consistently constrained. Asked about the results, the Director of Huntington's Community Development Agency noted that the changes had been quite effective.

I believe I can say that things are going reasonably well. The multi-meters and increased parking fees have pushed cars into the parking lots exactly as planned. It is remarkable how many on street spots can be found as opposed to just before.

— From a 6/11/2014 email from Joan Cergol, Director of Huntington Township Community Development Agency

The Chairman of the Huntington Township Chamber of Commerce echoed this assessment. More specifically, he notes that availability had significantly improved along the Village's two, primary commercial streets, despite the fact that overall supplies were constrained.

Certainly the recommendations in your report have freed up parking on New York Ave. and Main Street but the problem of parking overall (quantity) is an issue and I know that the town is looking at a couple of possible scenarios that would address this issue.

— From a 4/7/2015 email from Bob Scheiner, Chairman Huntington Township Chamber of Commerce

These were the spaces that, more than any other parking option in the Village, were noted to be the only parking option that many customers would use. Freeing these spaces up, was therefore a top priority. During this email exchange, Joan Cergol updated her observations on these improvements.

I echo Bob's comments that quantity remains at issue and as we approach the spring/summer months we are going to see continuing evidence of that. That said, it seems there is always on-street parking to be found so we have certainly accomplished the important job of changing and managing parking habits. That was a tremendous step in the right direction.

— From a 4/9/2015 email from Joan Cergol

HAVERHILL, MA

In 2012, the Town of Haverhill instituted its first-ever pricing program for parking on weekdays between 3:00 p.m. and 8:00 p.m. in on-street spaces in certain high-demand locations. Parking in these locations during metered hours is also strictly limited to two hours. The program, among other goals, was designed to achieve a 15% availability rate on, and balanced usage of, on-street parking resources.

An initial study found that in 2012, following the program's implementation, the high-demand locations eased out as hoped, while the actual number of cars parked in both on-and off-street spaces throughout all hours actually increased, compared to 2010 levels. A follow-up, 2015 study of the program found that about 70% of users were satisfied with the system, however, the study also found that the low fee ($0.50/hour) was insufficient to cover the costs associated with running the program.

OTHER CITIES WITH EVENING ENFORCEMENT

As more and more cities are finding that evening activity peaks are becoming increasingly central to their downtown economies, it has become increasingly common to find meters enforced beyond the end of the "workday". Below is a partial list of cities that have extended their meter enforcement schedules to 8PM or later.

- Detroit, MI: 7:00a.m. to 10:00p.m. Monday through Saturday[1]
- Royal Oak, MI: 11:00 a.m. to 12:00 a.m. Monday through Saturday[2]
- Ferndale, MI: 10:00 a.m. to 9:00 p.m. Monday through Saturday[3]

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[1] http://detroit.cbslocal.com/2011/07/19/extended-hours-in-effect-at-detroit-parking-meters/

[2] http://www.ci.royal-oak.mi.us/departments/treasurers-office/parking-and-parking-permits

[3] http://www.ferndalemi.gov/Visiting/Parking_Transportation

- Birmingham, MI: 9:00 a.m. to 9:00 p.m. Monday through Saturday[4]
- Cincinnati, OH: 9:00 a.m. to 9:00 p.m. Monday through Saturday, and 2:00 p.m. to 9:00 p.m. on Sundays[5]
- Columbus, OH: 8:00 a.m. to 10:00 p.m.
- Boston, MA: 8:00 a.m. to 8:00 p.m. Monday through Saturday[6]
- Old Pasadena, CA: 11:00 a.m. to 8:00 p.m. Sunday through Thursday, and 11:00 a.m. to Midnight on Friday and Saturday[7]
- Park City, UT: 11:00 a.m. through 8:00 p.m. daily[8]
- Princeton, NJ: 8:00 a.m. to 8:00 p.m. Monday through Saturday, and 1:00 p.m. to 8:00 p.m. on Sunday[9]
- Champaign, IL: 8:00 a.m. to 9:00 p.m. Monday through Friday[10]
- Long Beach, CA, Downtown Core: 9:00 a.m. through 9:00 p.m. daily[11]
- Bethesda, MD: 9:00 a.m. through 10:00 p.m. Monday through Saturday[12]
- Washington D.C. "premium demand zones": 7:00 a.m. to 10:00 p.m. Monday through Saturday[13]
- State College, PA: 10:00 a.m. to 10:00 p.m.

PERFORMANCE-MONITORING PROCESSES

OVERVIEW

Effective performance-based pricing requires performance monitoring — tracking the availability of parking spaces, continuously or via "spot checks" during peak-demand conditions. To ensure a desired level of space availability – often a formally identified target measure, such as 15% of spaces being unoccupied – parking managers must strategically monitor parking occupancy conditions. This should prioritize, but not necessarily be limited to, locations and times that consistently experience peak-demand conditions.

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[4] http://www.bhamgov.org/government/departments/police/parking.php

[5] http://www.downtowncincinnati.com/parking-downtown/parking-overview

[6] http://www.cityofboston.gov/parking/meters.asp

[7] http://www.oldpasadena.org/info.asp

[8] http://www.parkcity.org/home/showdocument?id=9187

[9] http://www.princetonparking.org/enforce.html

[10] http://ci.champaign.il.us/departments/public-works/parking-programs/customer-service/parking-rules-and-regulations/

[11] http://www.downtownlongbeach.org/parking

[12] https://www.bethesda.org/bethesda/street-parking

[13] http://ddot.dc.gov/page/parking-meters

The primary objective of performance monitoring is to inform parking rates and rate-adjustments, and/or other management/regulation adjustments, and to document the impact of such on performance/availability.

A performance-monitoring program in support of performance-based pricing should center on the following sequential steps.

1. Define performance to be measured.
2. Define success (performance target/s).
3. Monitor conditions.
4. Evaluate performance & adjust rates.

PROGRAM STEPS

Define Performance to be Measured: Availability

The primary performance measure should be "availability" – the proportion of viable parking spaces that remain vacant and available for parking at a given point in time. Achieving optimal availability conditions can bring about several parking-management objectives. The two most significant and transformative are:

- Improved customer experiences, as more parking options are more consistently available, more of the time; and
- Reduced traffic congestion and vehicle emissions, as drivers simply park once they have arrived at/near their destinations, or at their first-choice parking option.

Define Success: Modest but Consistent Availability

Performance-based pricing success can be broadly described as resulting in a modest, but obvious and consistent, level of availability among all primary parking options — just enough so that the empty spaces are apparent to drivers seeking out a space – particularly during peak-demand conditions.

On-Street Availability Targets

The most widely-adopted target measure for on-street availability is 15% of spaces — just enough so that empty spaces are quickly perceivable to drivers upon approaching a blockface. This is an ideal performance measure for any location, and at any time. Achieving it, however, will be most challenging, and therefore essential, during times of peak parking demand.

Off-Street Availability Targets

Performance targets for off-street parking are less standardized as they should be dependent upon facility programming and design, which can be highly variable compared to on-street parking. In general, availability targets should be at least moderately lower than the 15% target for on-street parking. There is little risk of lower availability conditions generating "search traffic," as the travel patterns of drivers in off-street facilities is largely determined by the facility layout – drivers essentially drive in a fixed pattern until a suitable space is found. For most drivers, the first space found is likely to be preferred over any space that a continued search might offer, reducing the propensity for drivers to circle back to repeat search patterns.

However, at some point, very low levels of availability will reduce the functionality of an off-street facility. For these facilities, efficiency and maximized utility require an optimal balance between maximum occupancy and internal circulation efficiency (getting vehicles into the facility as quickly as possible). Too few empty spaces can slow internal circulation, reducing the turnover process that is especially important to commercial operators and any operator serving hourly customer markets. Suboptimal internal circulation conditions can also reduce the appeal of a parking facility, as drivers consistently find themselves stuck in entry/exit congestion.

As such, the performance target can be qualitatively defined as the highest level of occupancy that a facility can accommodate without congesting internal circulation. Typically, 85% occupancy is a too-modest target for this; 90% - 95% is much more common. Facility characteristics that can most significantly determine optimal occupancy levels include the following.

- Hourly vs. Monthly customer balance – Target occupancy levels can be set close to 100% in facilities that primarily cater to monthly customers, but have sufficient hourly-parking demand to fill spaces that remain empty after the morning peak.
- Facility design – Facility design and layout can affect circulation efficiency, as can entry and exit processing procedures and technologies. The more efficient the facility is in either or both aspects, the higher its occupancy target can be.
- Real-time information system – This can increase internal circulation efficiency, by reducing the need for drivers to attentively scan facilities for empty spaces. This is especially true for systems that identify availability by floor, and even more so for systems that visually identify empty spaces individually.

Monitor Conditions

Measure and Track Availability Levels

Performance monitoring requires a program of regularly collecting measures of occupancy. This is typically executed through one of three approaches: manual field surveys, digital sensors, or the use of meter-transaction data to estimate occupancy conditions. Commercial services, such as Smarking, which is currently supporting performance-based pricing for off-street parking managed by the City of Grand Rapids, uses a version of the latter of these approaches to monitor on-street conditions as well, as they have done in support of seasonal on-street meter rates in Aspen, Colorado.[14]

Manual-Count Surveys

Field surveys continue to be used to document occupancy/availability levels among curbside parking inventories, particularly in small cities, many of which were early adopters of performance-based pricing programs. Frequent and/or expansive surveys, however, are labor intensive to complete with staff, and costly to outsource. This approach can be highly reliable, and remains a standard for checking the reliability of technology-enabled, labor-saving approaches, including those outlined below. Further, license-plate-recognition devices can increase the processing speed, and reduce the labor requirements, of "manual" counts.

Meter-Transaction Data

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[14] https://www.dropbox.com/s/wlx1ce4a1dq9vqn/Aspen%20Smarking%20Case%20Study.pdf?dl=0

Many cities that have grown wary of the downsides to digital-sensor systems have begun to use meter-transaction data to estimate curbside occupancies. This offers a similarly robust "stream" of data as sensor systems, without the cost and complications of dedicated technology. It allows parking managers to "measure" occupancy from any previous date, at any particular time; a distinct advantage over relying on manual field surveys. This approach is not without challenges, as meters will occasionally be "over-paid" while others will be "under-paid." The latter occurs in particular where there is parking placard use and/or abuse. An emerging trend is to combine meter payment data with observed occupancy surveys. By merging these data streams, cities are developing models to support performance-based parking strategies, as there is a strong positive relationship between payment rates and occupancy rates.

This method is evolving, most notably as part of the SFpark program.[15]

Commercial Services Option

Smarking is a data analytics software platform for parking systems. The software can collect transactional data from on-street meters and/or off-street facilities to provide customized data reports and analytics. It can also sync with garage entry/exit data for a more direct estimate of occupancy over time. This is highly useful for estimating occupancy in metered areas and for off-street facilities, but Smarking cannot provide measures of parking demand where or when pricing is not in effect.

Smarking relies on meter payment status and garage access control or payment data to estimate occupancy. It is important to note, this is not the same as occupancy data. The difference between meter payment status and occupancy will differ in various cities and neighborhoods. Spot checks should be used to check the accuracy of Smarking data and analytics, and to work with Smarking representatives to adjust the model to ensure it is responding to local conditions/contingencies.

Evaluate Performance & Adjust Rates

Following is an overview of steps for establishing a process of collecting and analyzing data, and making rate adjustments in response to findings (and in pursuit of defined availability targets).

On-Street Parking

Collect Data: Spot Counts

At a minimum, monthly counts during identified peak-demand periods (likely weekday midday + Friday night)

Collect Data: Transaction-Based/Smarking Data

- Define the base data set.
  - Occupancy counts are only needed for "general parking meters" – the typical, regulated spaces available to all.
  - Data sets should not include special meter types, such as loading zones or short time limits.
- Filter out any blocks that have high non-payment levels.

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[15] http://sfpark.org/wp-content/uploads/2014/05/SIRA-methodology-and-implementation-plan_2014_05-14.pdf

- Pull a two-week sample of data from Smarking, every month, formatting it to fit time buckets.
    - Exclude Mondays, Friday, holidays – so Tues-Thurs.

Adjust Rates

- Set parameters for triggering rate adjustments, such as the following.
    - When occupancy is 85-100%, the hourly rate is increased by $0.25
    - When occupancy is 60-86%, the hourly rate is not changed.
    - When occupancy is 30-60%, the hourly rate is lowered by $0.25.
    - When occupancy is less than 30%, the hourly rate is lowered by $0.50.
- Adjust rates no more than twice per year
    - Generally, annual rates are preferred, except in larger city centers and/or during the first year of performance-based pricing.
    - Allow at least two weeks after rate adjustments to pull new data for evaluation.

Off-Street Parking

- Conduct occupancy counts around the 1PM hour, or pull peak-occupancy data where available, at least every quarter, preferably monthly.
    - The more days, the better, to provide a running average
    - Exclude Mondays, Friday, holidays.
- Follow guidelines for permit and hourly parking, as outlined below.

Monthly/Annual Permits

Quarterly Assessments:

- If the average peak-utilization measure is below 80%, issue more permits for that facility.
    - # of new permits sold should roughly equal 1% of the facility's capacity, multiplied by the difference between the peak-utilization average and 90%.
        - For example, if the average weekly-peak measure for a 200-space garage is 70%, issue 40 more permits (20% of 200 = 40) for that facility.
        - This is a conservative increase in permit issuance, as it would push the 85th percentile measure up to 90% only if all 40 new cardholders use the facility at a 0% "absentee" rate.
- If the average peak-utilization measure is at or above 95%, raise the monthly permit rate by 10-20%.
- Continually invest parking revenues in mobility programs, services, and infrastructure, as well as programs to help reduce drive-alone commute rates, and subsequently help avoid permit-rate increases.

Hourly

- Apply a process similar to the on-street process outlined above, but with the following thresholds.
- Set parameters for triggering rate adjustments, such as the following.
    - When occupancy is 90-100%, the hourly rate is increased by $0.25
    - When occupancy is 60-90%, the hourly rate is not changed.

- When occupancy is 30-60%, the hourly rate is lowered by $0.25.
- When occupancy is less than 30%, the hourly rate is lowered by $0.50.
- Adjust rates no more than twice per year
  - Generally, annual rates are preferred, except in larger city centers and/or during the first year of performance-based pricing.
  - Allow at least two weeks after rate adjustments to pull new data for evaluation.

Monitor and Calibrate Model Performance

- Periodically spot check proxy (Smarking, transaction-based, etc.) data with field-collected data via manual/LPR counts.
- Calibrate the in-house mode, or work with model vendor, to address any significant inconsistencies.

CASE STUDY: *SFPARK*

San Francisco's Municipal Transportation Agency (MTA) created the *SFpark* project to pilot a citywide, robust implementation of performance-based pricing for on-street parking. The program established different rate periods for weekdays and weekends based on observed parking demand. Rates were then adjusted gradually and periodically based on demand. Rates changed no more often than once per month.

Performance-Based Pricing

Rates were set with the goal of maintaining no more than 80% occupancy on any single block.[16] For each block, prices can vary by weekday and weekend and by time of day (divided into three to four "time bands" for simplicity; e.g., "9 a.m. to noon"). The example below shows all time bands and recent rates for the 100 block of Berry Street, where the meters operate from 9 AM to 10 PM. On this block, demand is highest on weekdays, somewhat lower on weekends, and substantially lower in the evening. Rates vary accordingly.

Figure 2   Time of Day Parking Rates in San Francisco – An Example

Day Type	From Time	To Time	Rate
Weekday	9 AM	12 PM	$4.25
	12 PM	3 PM	$4.25
	3 PM	6 PM	$4.25
	6 PM	10 PM	$0.75
Weekend	9 AM	12 PM	$3.50
	12 PM	3 PM	$3.75
	3 PM	6 PM	$3.75

[16] San Francisco Municipal Transportation Agency, *SFpark: Putting Theory into Practice* (San Francisco: SFMTA, August 2011), p. 25.

		6 PM	10 PM	$0.75

Monitoring & Evaluation

Occupancy rates were *initially* determined using data from wireless in-ground parking occupancy sensors and were calculated by dividing the total number of seconds the block was occupied by the sum of total occupied seconds and total seconds the block was vacant. Occupancy rates were calculated on whole hour increments – the total number of occupied seconds, divided by 3,600.

Rate Adjustments

The program's original approach to performance-based rate adjustments is outlined below.

- When occupancy is 80-100%, the hourly rate is increased by $0.25
- When occupancy is 60-80%, the hourly rate is not changed.
- When occupancy is 30-60%, the hourly rate is lowered by $0.25.
- When occupancy is less than 30%, the hourly rate is lowered by $0.50.[17]

In the first two year of the program, the MTA implemented 13 rate adjustments using occupancy calculated from parking sensor data.

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[17] Ibid. p. 26. Recently, the City found that after numerous rounds of performance-based price adjustments, rates very rarely needed to be lowered by $0.50, and for the sake of simplicity, eliminated this rate adjustment band.

From Sensors to SIRA

At the end of 2013, when the project's federally funded parking sensors reached the end of their useful lives, they were deactivated and not replaced. *SFpark* staff decided not to purchase and operate new sensors, due to a variety of problems experienced with this emerging technology, including problems with reliability, accuracy, cost, and replacing sensors removed without warning due to construction projects.

To replace the data these sensors provided, staff developed a new methodology to estimate parking occupancy using meter payment data, which it subsequently named the Sensor Independent Rate Adjustment (SIRA) methodology. [18] This approach was developed using the sensor data accumulated over 2+ years of operation (supplemented by manual counts for quality assurance), and compared it to estimated occupancy measures using revenue data from parking meters over the same time period. The SIRA model was found effective, and since June 2014, the City has used the model to continue making regular performance-based rate adjustments to on-street parking. The model allows the City to continue performance-based pricing, without needing sensors.

SIRA Overview

The Sensor Independent Rate Adjustment (SIRA) model was developed to estimate occupancy from transactional data in the absence of physical sensors.

The model uses meter payment rates to estimate occupancy rates on each block. At any snapshot in time, the meter payment rate is the share of total spaces available that are also paid. The parking occupancy rate is the share of total spaces available that are also occupied. The occupancy rate is usually higher than the payment rate because not everyone who parks pays (sometimes because a driver is not required to pay, and sometimes because the motorist parked illegally).

Using a statistical regression analysis model, San Francisco developed the following simple linear model equation:

$$\text{Occupancy Rate} = 29.283 + 0.808 * (\text{Payment Rate})$$

As one example, using this model, a payment rate of 50% yields an occupancy rate of about 70%. *SF*park's Sensor Independent Rate Adjustments (SIRA) Methodology & Implementation Plan[3] provides extensive detail on the development of the model and important additional information on how to use it. The document also describes two slightly more accurate model equations, which customize the model for different San Francisco districts.

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[18] San Francisco Municipal Transportation Agency. "Sensor Independent Rate Adjustments (SIRA) Methodology & Implementation Plan," May 14, 2014. http://sfpark.org/wp-content/uploads/2014/05/SIRA-methodology-and-implementation-plan_2014_05-14.pdf. Accessed February 28, 2016.

BROKERING SHARED PARKING

CONCEPT OVERVIEW

Shared parking is the co-location of off-street parking in a single location that serves the parking demand for multiple land uses in a mixed-use context. Shared parking is particularly valuable in walkable, mixed-use centers in which small, private lots tend to be overwhelmed with demand when their associated land uses are busy, and significantly under-utilized much of the rest of the time. Fortunately, such districts also present two distinct, cross-supportive shared-parking opportunities that can reduce parking supply needs while providing more destinations with "overflow" parking resources.

Staggered Peaks

The first shared parking opportunity offered by mixed-use development comes from the staggered demand peaks associated with each use. Different land uses generate unique levels and patterns of parking demand. Parking supplies at mixed-use locations accommodate these demand fluctuations more efficiently than segregated supplies by accommodating peaking uses with spaces left vacant by other uses. Thus, the same parking lot that was full of workers' vehicles during the day can be used for residents at night.

Because parking demand for different land uses fluctuates throughout the day, each land use within a mixed-use development has a variable parking demand rate by time of day. Shared parking does not reduce parking demand per se. Rather, it reduces the number of spaces needed to meet the parking demand. These efficiencies allow for a much smaller "parking footprint", and thus reducing the space between buildings, while lowering the cost of development, housing, goods and services in urban districts.

Internal Capture

Mixed-use projects allow for parking efficiencies through "internal capture" trips. Such trips are made by patrons who, having already parked, travel between uses without accessing their vehicle. Restaurants and retail services are common generators of internal capture trips in mixed-use developments, as they serve both employees and residents within the same development. Not only does this proximity of uses present an opportunity to conserve land area from parking uses, but it reduces localized congestion as local employees and residents can easily access everyday goods and services within walking distance.

Some cities have maximized shared parking by facilitating the public use of private parking during a given building's off-peak hours (i.e. the evening in a parking lot associated with an office building). Increasing the share of parking in a given area that is open to public use can also help justify reduced accessory parking requirements, which can in turn ensure that more land is reserved for active uses.

CONTEXTUAL CONSIDERATIONS

Shared parking is particularly valuable in walkable, mixed-use centers in which small, private lots tend to be overwhelmed with demand when their associated land uses are busy, and significantly

under-utilized much of the rest of the time. In cities with effective municipal parking systems, this is typically the result of a legacy of parking requirements and/or development patterns that sought to ensure adequate parking at each destination, despite the typical physical constraints of development sites in walkable urban districts. As a result, the developed uses tend to never have enough parking when they need it most, and far too much at most other times. While it is essential to address any codes or developer tendencies that might continue this practice into the future, arrangements to share these parking capacities among affected developments can provide significant relief.

IMPLEMENTATION BARRIERS

Viable sharing arrangements often fail to materialize due to a lack of initiative among those seeking more capacity, or to liability concerns among those with excess capacity. Cities can play a vital role in realizing these potential capacity gains by engaging these parties, actively exploring the following options.

- Liaise between business, property, and lot owners with recognizable opportunities for mutually beneficial arrangements.
- Initiate negotiations by providing an independent perspective on issues and opportunities, identifying shared-benefit opportunities, and helping to address common concerns.
- Negotiate agreements, including identifying strategic agreement components, as necessary, such as:
  - Compensation in the form of increased lot maintenance, lot improvements, added security, etc.
  - Restricting access to the shared parking, via permits, to area employees to reduce risk and increase accountability.
  - Defining any added security or enforcement measures necessary to ensure that the primary uses of the lot are prioritized.
- Stepping in to remove stubborn barriers to viable arrangement, when feasible.
  - This commonly includes assuming added liability-insurance costs related to the sharing agreements.

ROLE OF TECHNOLOGY & INNOVATION

Below are two case studies presenting innovative approaches to optimizing shared-parking potential in downtown districts, both incorporating pay-by-phone technology.

CASE STUDIES

Pay-by-Phone as Shared Parking Broker: Asheville, NC

Drivers in downtown Asheville can pay for the City's on-street parking using the Passport Parking App. Signage denotes the parking zone and provides instructions to pay for parking using a cell phone. If users do not have a smartphone, they can still pay using their phone by calling a number and specifying the zone or by texting a code (after registration).

Recently, private lot owners approached Passport, the third-party provider of Asheville's parking app, to become part of the same payment system. Passport assigns the lot a "Zone," and incorporates the lot into the app with the other Asheville parking resources. The lot owner posts signage describing the rates and regulations for the lot (see Figure 3). Some lots maintain their private parking for periods of the day and convert to public parking in off-hours. Others operate as privately-owned, public parking throughout the entire day. Either way, private lot owners are able to take advantage of the city's easy-to-use parking system without giving up control of the lot itself.

The Asheville example highlights how cities themselves may not need to convince private lot owners once pay-by-cell programs have become established in a city. Sometimes, the ease and simplicity offered by the app is enough of an incentive to motivate lot owners to seek out participation themselves.

Figure 3   Private Lot with Public Payment after 5pm – Asheville, NC

City as Shared Parking Partner: Omaha, NE

The City of Omaha recently branded the Parking Division of its Public Works Department as Park Omaha to signal a commitment to provide coordinated and strategic management of its on- and off-street parking resources. A key component of the Park Omaha mission was to set up a system to incorporate private parking facilities as a means to avoid building more City facilities. "We want to maximize efficiency, minimize frustrations and develop an extensive shared parking network."[19]

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[19] https://parkomaha.com/about/

Figure 4   **Park Omaha map showing City & Partner Off-Street Parking**

Source: https://parkomaha.com/map/
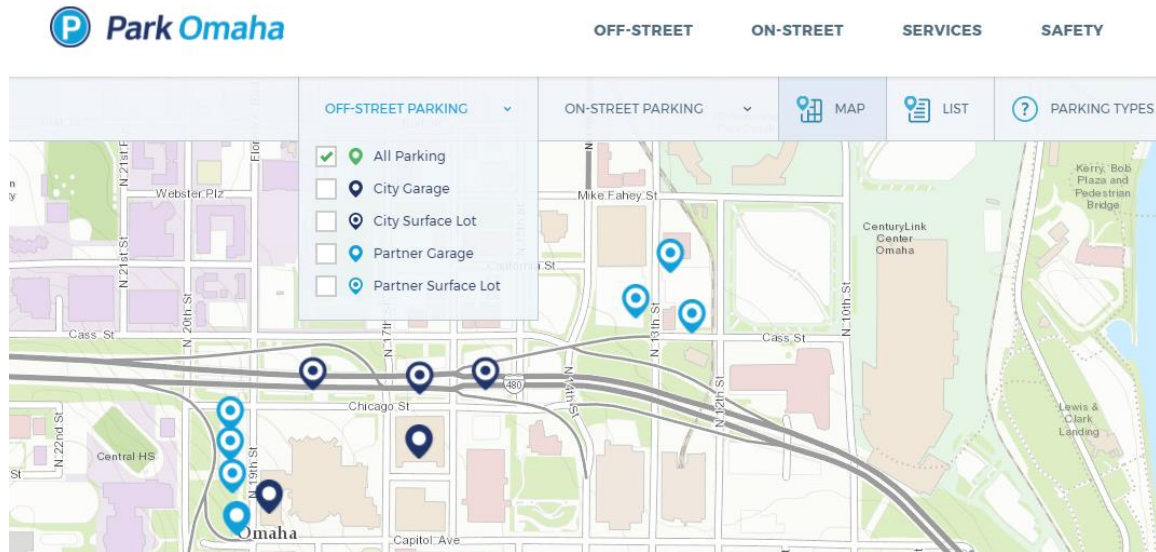
The result of these efforts is the highly successful, Park Omaha Partners program.

Park Omaha Partners

Park Omaha launched the Park Omaha Partners program to "boost the number of public parking spaces and help visitors easily locate them in the popular downtown area".20 The program provides a user-friendly, online process for property owners to offer their unused spaces, at a specified schedule, to the Park Omaha network through a shared parking agreement. The process begins with an online application – see below.

Accepted Partner locations are added to the Park Omaha interactive map. An expanded map view also provides information on rates, hours of operation and payment options. Park Omaha identifies these facilities, as "partner" facilities, and distinguishes them from Park Omaha facilities, in its maps and information materials. As Partner facilities, private lots are given official (copyrighted) signage/iconography with a distinct logo that identifies them as part of the City parking system, while indicating that hours of access, rates, and other regulations may vary from standard Park Omaha facilities. The copyrighted branding helps to prevent unapproved private lots from using the same design and calling themselves Park Omaha Partners.

One of the key tools to make this work has been facilitating payment via the Park Omaha App. Partner facilities are given a unique payment-zone designation to use this mobile-payment system, allowing drivers to pay for parking exactly as they would in a City facility. Payment revenue goes directly to the facility owners, thus allowing private facility owners to monetize their excess parking without having to set up payment systems. This has been a critical component in recruiting new Partners to the program.

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20 https://parkomaha.com/about/park-omaha-partners/

Figure 5   Partners Application Portal

Interested in becoming a Park Omaha Partner?

If your residential or business building has unused parking spaces (for example after 5 p.m. or on weekends) and you would like to be part of the shared Park Omaha Partner program, fill out the form below or call City of Omaha Parking Division at 402-444-PARK to learn more.

NAME OF FACILITY

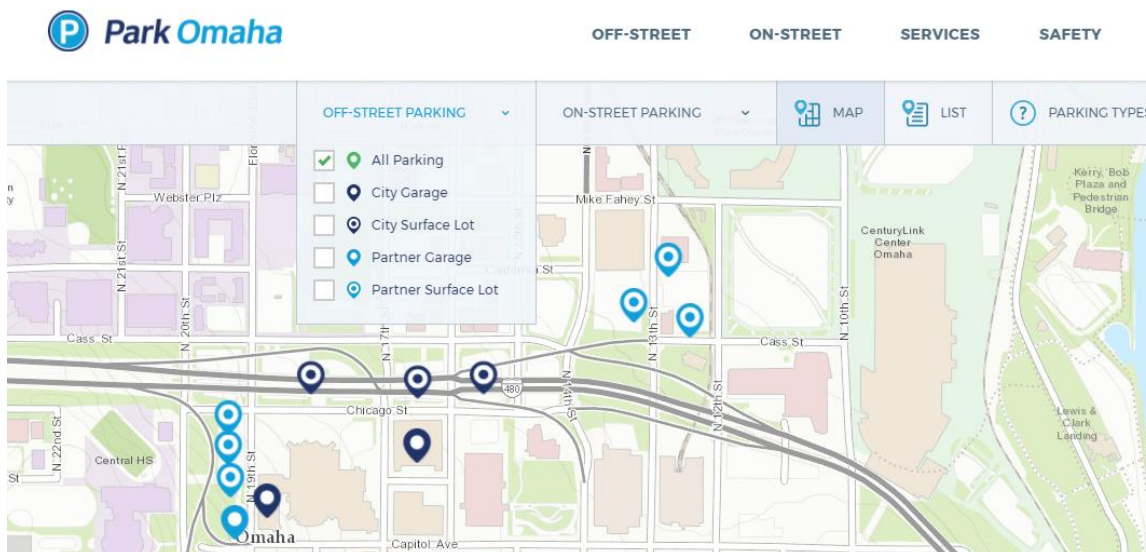LOCATION OF FACILITY *

TYPE OF FACILITY *

AVAILABILITY *

How many spaces will you have available for public parking?

HOURS/RATES *

Source: https://parkomaha.com/about/park-omaha-partners/

Figure 6   Park Omaha map showing City & Partner Off-Street Parking

Source: https://parkomaha.com/map/

Program Collaborators

- The City's Planning and Public Works departments, with the guidance of the Mayor's Office, have partnered with Park Omaha to ensure that parking is part of the downtown trailblazing system – signs that lead visitors to popular venues.

- Park Omaha contracts with Republic Parking to operate and administer the parking system, provide professional customer service, make parking upgrades, and oversee a Parking Ambassador program.

- A parking advisory committee – comprised of representatives from city staff, retailers, developers and business leaders – provides guidance on parking improvements, rates and makes recommendations.

Keys to Success

The City initiated private lot participation in the Partners program by giving presentations to local lot owners and operators. Park Omaha has seen the prospects of the Partners program become increasingly attractive to private facility owners, especially as the approach proves viable and profitable, and the technology has successfully incorporated private facilities to handle demand, even from large events, seamlessly.

Challenges

While the proliferation of smartphones and mobile payments offers distinct benefits for cities that wish to incorporate privately owned parking into their systems, there are challenges to consider associated with this strategy. For one, some private owners may fear the added liability associated with opening up the lot/structure to the public. In addition, incorporating private resources means choosing to standardize or not standardize pricing, hours, and regulations across available parking resources. This could cause confusion or work against shared parking management goals, and should be considered as part of any partnering processes.

RESIDENT PERMIT PARKING

CONCEPT OVERVIEW

Residential permit parking (RPP) programs can improve on-street parking availability for local residents within a specific neighborhood/district, typically by issuing permits to local households and restricting parking for non-permit-holders during selected hours, and/or on selected days. RPP programs originated as a means to keep parking-demand from adjacent commercial business districts or nearby transit stations from "spilling over" into residential areas. In some more densely urbanized locations, they have been implemented as a means of managing resident parking demand, and bringing resident-vehicle curbside occupancy levels more in line with available supplies.

Figure 7   Resident Permit Parking in Medford, MA

OBJECTIVES & BENEFITS

- Ensure parking availability for local residents, particularly during times of high demand within a specific neighborhood or district.
- Help maintain the value of homes in urban districts, particularly where homes have minimal or no off-street parking, by ensuring consistent and convenient parking opportunities.
- Reduce public concerns about "spillover" impacts from strategic parking management (pricing, restrictions, etc.) and zoning (reduced minimum parking requirements, parking maximums, etc.) practices.

GOALS & PRINCIPLES

- Prioritize parking for residents and their guests.
- Make clear that affected streets remain public resources, with particular preference given to residents only where and when access to housing would otherwise be constrained by drivers with more suitable parking options.
- Maintain public parking access when resident demand is more modest.
- Make clear that the purchase of a permit does not guarantee the permit holder a space on any given block, parking lot or particular location.
- Control the number of issued permits to ensure that the on-street spaces are not overwhelmed.
  - This is generally only an issue in higher-density neighborhoods in which most households lack access to dedicated off-street parking options.
  - The City of Toronto, for example, caps the number of permits issued to the curbside-parking capacity within each zone, and limits households to single permits until all eligible households have secured or declined to purchase a permt.
- Incorporate clear signage and user-friendly technology options so the program is easy to understand for motorists and simple to enforce for staff.

KEY ELEMENTS

Core elements of an RPP program include the following.

- **Zones**: Assign permits to appropriately-sized residential areas/neighborhoods.
- **Petition-initiation**: Consider new zones in response to a petition signed by representatives from households that would be affected.
  - Most cities with an RPP require a minimum number of residential units in the proposed RPP area to sign a petition of support and that a majority of their residents approve of program implementation.
  - Required majority levels range from 50% (Boston, MA and Portland, OR) to 80% (Chicago, IL).
- **Hardship**: Confirm conditions of reduced resident access to neighborhood street parking before final approval.
- **Fees**: Ensure that these cover the cost of administering the program, if not the cost of maintaining the affected streets. Some cities have adopted more strategic pricing approaches, particularly to address locations where resident permit demand is significantly higher than curbside capacities.
- **Schedule:** Customize enforcement hours to respond to local demand conditions, breaking from the initial tendency to set hours around the workday. This has become a more common practice, and city-center neighborhoods have continued to attract "24/7" activity.
- **Visitor Parking**: Typically accommodated through visitor permits, a small amount of which is commonly provided with a resident permit with the option to purchase more. Some cities have begun to meter high-demand neighborhood blocks, exempting resident-permit holders, as a means of accommodating visitor parking needs without having to administer visitor permits.

Figure 8   Arlington County, VA Parking Permit Types

Zone Permit   Flex Pass   Visitor Pass
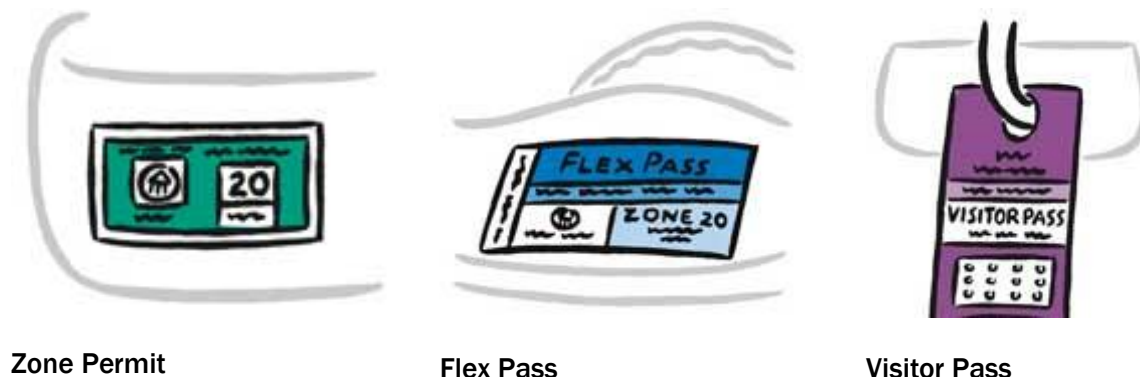
AREAS OF INNOVATION

More innovative practices in managing RPP programs include the following.

- **Limiting Permits:** Cap the number of permits based on supply, to ensure consistent availability for permit holders. Toronto is the only city in North America that currently has a cap.

- **Limiting Household Permits:** Limit the number of permits a household can purchase, to seek more consistent availability for permit holders. Providence, RI, and Sacramento, CA, limit permits to 2 per residence; Seattle, WA, limits permits to 4 per residence.

- **Graduated Permit Rates:** Discourage overuse of curbside parking in high-demand areas, by charging households an escalating rate for multiple permits. Arlington County, VA was an early adopter of this approach, and continues to use it to manage demand for permits in its more walkable urban districts.

- **Grandfather Established Households:** Restrict the eligibility for permits based on development date, access to off-street parking, land-use type, geographic area, or other characteristics. Atlanta only allows one permit per resident for those with available off-street parking. Seattle micro-housing developments allow up to four permits per kitchen.

CONTEXTUAL CONSIDERATIONS

RPP programs are particularly useful and sought after in residential areas near a transit station, a commercial/employment center, or any destination that generates significant parking demand. RPP can also help reduce resistance to effective curbside management efforts in commercial and mixed-use areas, by reducing the risk that pricing/restrictions in these area will shift parking demand into nearby areas. Similarly, an effective RPP program can reduce public pressure to maintain minimum parking requirements for new development, which many established residents consider the only effective means of preserving their curbside parking from the impacts of growth.

IMPLEMENTATION APPROACHES

One of the challenges of effective RPP implementation is that its core elements are often managed by separate government entities. This can make it particularly difficult to bring RPP programs into effective coordination with municipal parking management programs. When establishing a

new program, therefore, as many of the following functions as possible should be managed by the managers of the City's public parking system:

- Establishing permit zones and curbside restrictions to be applied in each, including their schedule.
- Accepting petitions for new zones, or changes to regulations in existing zones.
- Setting rates and investing revenues.
- Issuing permits, including visitor permits if applicable.
- Enforcing compliance and collecting citation revenue.
- Supporting broader curbside parking management efforts and the overall public parking system.

CASE STUDIES

Daytime Business/Employee Permits: Aspen, CO

The City of Aspen established Residential Permit Parking zones to prevent overflow parking from the city's downtown, which implemented paid parking in 1995. Residents are provided with parking permits and visitors are allowed to park for free for up to 2 hours in an 8-hour period. To increase utilization of on-street parking facilities towards 85% occupancy, the city sells 1-day visitor passes to park for more than 2 hours in RPP zones. Any visitor may purchase day passes without involvement of a resident for $7 at a local grocery store, via pay-by-phone, or at one of 15 neighborhood pay stations.

Businesses in RPP zones are allowed to purchase business vehicle permits, which are non-transferable and cost $1,000 per year. Lodges within RPP zones can purchase parking permits for guest use. After lodge employees were found using guest permits for personal parking, the City implemented a "two strikes" program that banned lodges from purchasing permits when employees are caught twice abusing the program. Parking availability in residential neighborhoods is regularly monitored by the City and rates are increased when average occupancy in the neighborhood exceeds 85% over a 1-year period.

RPP zones are enforced using license plate recognition (LPR) technology, which allows the 3,000 residential-zone parking spaces to be checked 2-3 times per day. Enforcement vehicles identify cars that park in RPP zones for more than 2 hours in an 8-hour period without purchasing a day pass or holding an RPP. Physical passes are unnecessary as enforcement vehicles access a database with information on all residential pass holders.[21]

Residential Parking Benefit Districts: Austin, TX

Several cities, including Aspen, Colorado, sell permits for long-term parking in RPP zones to non-residents, in order to make use of excess daytime capacities to provide low-cost parking options to downtown employees. Most typically, this is simply a variant on the resident permit, at a significantly higher fee. This means that the added administrative cost of this option is fairly negligible, providing an opportunity to set aside revenue for meaningful neighborhood investments, as the City of Austin has done.

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[21] *Contemporary Approaches to Parking Pricing: A Primer*, USDOT-FHWA, 2012

A Parking Benefit District (PBD) pilot program was established by the City of Austin in July 2005 on a seven block corridor in an area known as "West Campus" to address resident's concern over spillover parking from nearby commercial and educational establishments. The pilot included 96 pay and display multi-space metered parking spaces.

The West Campus pilot was successful in managing parking and generated revenue to construct streetscape improvements, such as improved sidewalks, crosswalks, transit shelters, bike lanes, curb ramps, and street trees, to help improve the neighborhood's pedestrian environment. Residents receive permits for themselves and their guests that exempt them from having to pay for parking in the District.[22] An ordinance was approved in October 2011 to establish a permanent PBD and the district was expanded in 2012 to a 25-block area. The PBD includes 385 multi-space metered parking spaces.

Figure 9   Austin's Residential Parking Benefit District
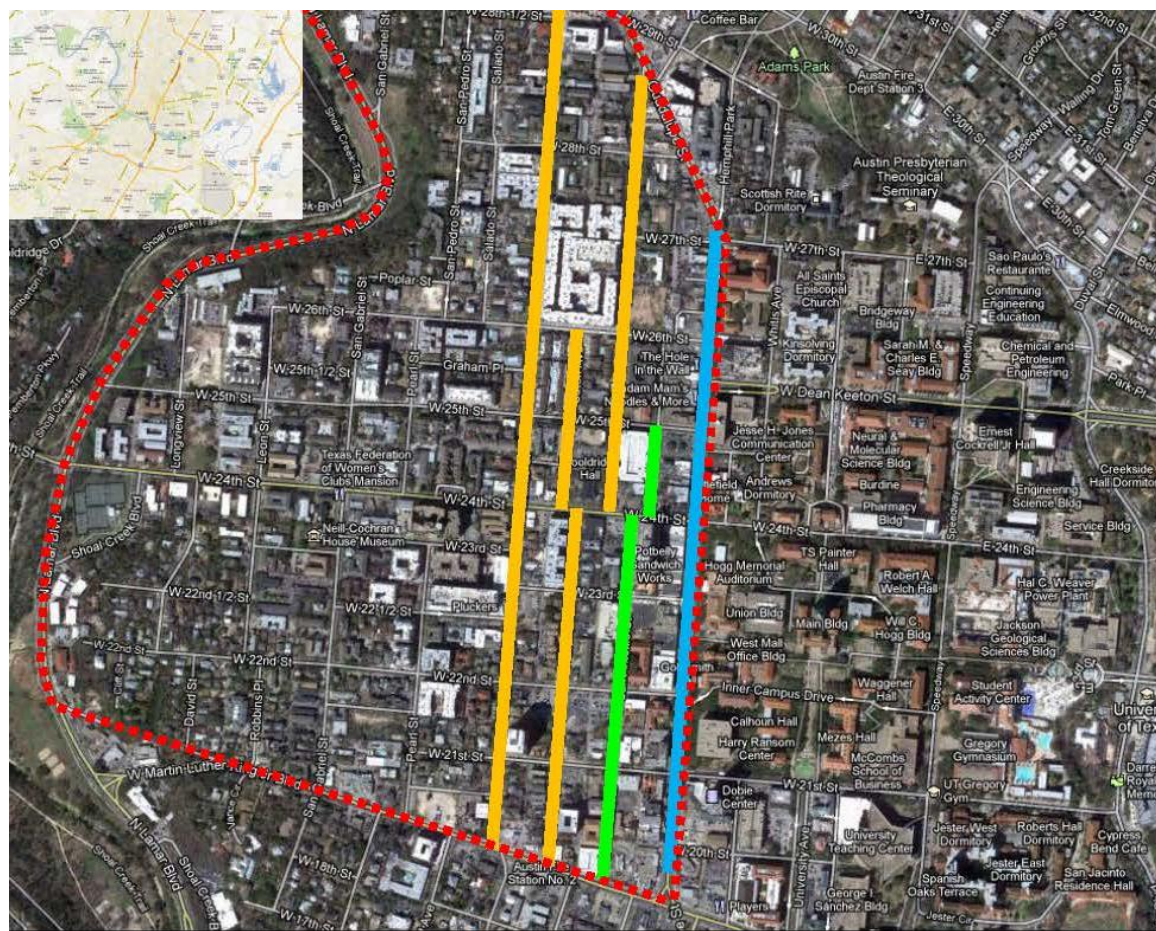
LEGEND
━━ Original meters   ━━ Pilot PBD meters   ━━ Permanent PBD meters   ▪▪▪ PBD boundary

Map source: Urban Land Institute-Louisiana

The neighborhoods included in the PBD boundaries receive 51% of the meter revenue generated within the district. These funds, while controlled by the City, are spent in accordance with input

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[22] "Parking Benefit District." City of Austin. austintexas.gov/department/parking-benefit-district-pbd.

from the district's neighborhood associations, which work in consultation with the City to develop priority-investment lists.[23]

Visitor Parking: Charleston, SC

The City of Charleston established its first residential permit parking district in 1975 to minimize the number of non-residential and commercial vehicles competing for parking in residential neighborhoods. Currently, there are 11 parking districts, ranging in size from a few blocks to several dozen, which cover much of downtown Charleston. Each residence within a Resident Permit Parking district is allowed up to two on-street parking permit decals for their specific district, and more than 8,000 permits are issued annually.

The City offers homeowners the option to purchase the following guest passes to accommodate their individual need for long term visitor parking:

- Single day pass
- Two week pass
- A booklet of 30 single-day passes at a discounted rate

Guest passes must be filled out and initialed by the homeowner and placed on the vehicle dashboard.[24]

[23] http://uli.org/wp-content/uploads/2012/12/ULI-LA-Study-on-Parking-Benefits-District-for-New-Orleans-FINAL.pdf (page 23)

[24] "Charlotte Curb Lane Management Study." Charlotte Department of Transportation. charmeck.org/city/charlotte/Transportation/Parking/Pages/CurbLaneManagementStudy.aspx).

LICENSE PLATE READER (LPR) TECHNOLOGIES

OVERVIEW

Parking enforcement vehicles equipped with LPR technology can provide highly efficient time-limit monitoring, parking-meter payment status, and residential permit parking (RPP) enforcement, while also providing a stream of data on vehicle occupancies that can be used to monitor utilization/availability conditions across downtown. LPR also provides visual evidence for infractions, when it occurs and when a citation is issued, which can be invaluable for adjudication purposes.

LPR technology has evolved into a core enforcement, permit-management, and scofflaw-mitigation tool for cities. LPR increases efficiency in several ways, including the automation of vehicle-location and parking-duration monitoring. This can significantly increase payment and time-limit compliance. LPR technology can also enforce RPP regulations, by validating the permit status of parked vehicles, if permits are linked to license plates.

KEY USES

Permit Enforcement

Many LPR vendors provide specialized technology for parking enforcement purposes and have developed the software to integrate with most citation, permit-management, and technology-hardware vendors.

Time Limit Enforcement

For time-limit enforcement, LPR provides digital chalking that can track the location of a vehicle, how long it was parked in a specific location/designated area, to track parking durations against posted time limits. This helps provide a more transparent, consistent approach to time-limit management, while reducing labor costs associated with traditional "tire chalking" systems.

Performance Tracking

LPR data can be used to measure parking occupancy, track availability, and monitor parking demand patterns, over time, in support of a Performance-Based management program. A daily data collection route could be incorporated into normal enforcement duties and routines. The information gathered from this routine procedure will provide an invaluable resource for analysis and ongoing assessment. This will also provide a substantial long-term cost savings since the City should not need to retain future occupancy study support services because the information will be systematically collected.

INTEGRATION

Integration requirements must be clearly defined in any vendor solicitation or new contract for citation, permit, and metering technologies. This will allow PEOs to link vehicle occupancies to

payment/permit requirements and/or time-limit restrictions. Integration requirements and the cost of any software development should be the burden of the parking technology vendors. Data integration must be addressed during the solicitation and contracting stage with each vendor and the City should have a standard application programming interface (API) requirement that is included with any parking solicitation. Integration with the enforcement handheld is imperative to maximize the efficiency of the PEOs and minimize the burden of equipment that they are required to carry.

COST

The approximate cost to support the installation of LPR equipment on an existing vehicle is approximately $50,000-$65,000, inclusive of training and infrastructure needs, the installation of the cameras on the outside of the vehicle, wheel-imaging camera, the processing unit in the trunk, and the in-vehicle PC and navigator set-up in the front seat.

PARK-ONCE ZONING

CONCEPT OVERVIEW

Well-managed municipal parking programs that provide a Park Once environment have been critical for maintaining many of the country's most vibrant commercial centers. They are a common trait among downtowns that maintained strong economies through decades of intensifying competition from suburban shopping centers. Their success, now furthered by market trends that again strongly favor walkable urban centers has, however, significantly increased the cost of developing new parking facilities as their economies and populations grow. Affordable development sites are increasingly rare, and public demand for increasingly better-designed parking facilities have significantly increased construction costs.

A common response to this set of constraints has been to revisit the zoning code as a means of ensuring that parking can be expanded, as needed, to support continued growth. A conventional approach, emphasizing minimum requirements for on-site parking at each development would, however, undermine the Park Once environment. To maintain these advantages, many communities have embraced zoning strategies that can enhance and expand Park Once achievements, while providing a new model for supply expansions.

OBJECTIVES & BENEFITS

- Ensure that public parking supplies can be expanded as needed, to avoid the redundant inefficiencies created by conventional parking requirements.
- Encourage continued growth by offering developers a variety of options to accommodate and/or mitigate the parking demand impacts of their projects.
- Raise the design and functional standards for new parking facilities.
- Generate mobility improvements and demand-reduction programs to both reduce parking demand and enhance increasingly sought-after multimodal amenities.
- Encourage shared use of existing private parking facilities that were built to meet previous parking requirements.

KEY ELEMENTS

- Incentives (or even requirements) to provide shared parking in privately developed parking facilities.
- Limits on private, on-site parking.
- No limits on shared, on-site parking.
- Incentives or requirements to directly provide mobility amenities and/or demand-reduction programs, as appropriate to the scale and use-mix of the project.
- A Joint-Development policy (see below) that leverages Park Once zoning, and seeks public-private, mixed-use projects as the primary mode of expanding public parking.
- Allowing parking built to meet previous code requirements to be shared
- A fee option to exceed limits on private, on-site parking.
- A fee option to waive any on-site parking requirements.
- Authority to use all parking-related fees to fund mobility improvements and demand-reduction programs, as well as public parking.

CONTEXTUAL CONSIDERATIONS

- Park Once Zoning strategies are particularly applicable in mixed-use districts that offer walkable densities, and thus potential for shared-parking and Park Once to improve mobility and reduce supply needs.
- An established, municipal parking program is a valuable asset to Park Once Zoning.
- Park Once Zoning can succeed without publicly-owned parking assets, with an increased emphasis on incentives or requirements for private development to provide shared parking.
- Park Once Zoning is particularly supportive of municipal parking programs that have expanded to embrace mobility and demand-reduction functions.
- Park Once Zoning can provide an important alternative to conventional minimum parking requirements, which are particularly incompatible with walkable urban environments, where eliminating minimum parking requirements altogether is not a viable, or the most suitable, option.

CASE STUDIES

Grand Rapids, MI: Master Plan Supportive Zoning

Grand Rapids updated its zoning ordinance in 2008. Following the lead of its 2002 Master Plan, with its focus on Smart Growth, the zoning update used the LEED-ND checklist as a starting point for addressing sustainability through neighborhood design and connectivity. This was the first major re-write of the zoning code in four decades. The update included significant changes to the City's parking requirements.

Reduced Minimum Requirements

Traditional Neighborhood City Center (TN-CC) Zone District

- The parking requirement for all new buildings with 10,000 or more SF of GFA was set at 1 space per dwelling unit and 1 space per 1,000 SF of non-residential and hotel uses.

    –   All requirements were waived for buildings built prior to January 1, 1998, and any new buildings or additions since then with a gross floor area (GFA) of 10,000 square feet (SF) or less.

<u>All other Zone Districts</u>

    ▪   Minimum parking requirements were halved for all uses in all other districts.[25]

In Lieu Fee Option

The ordinance grants the City the authority to establish a "parking program… to develop publicly-owned district parking lots or structures as opposed to individually owned and operated parking areas".

> *The Planning Commission may approve in-lieu payment for up to eighty (80) percent of required parking in the TN-CC Zone District, subject to review and approval under Site Plan Review procedures in Section 5.12.11.*

> *The City may, as part of any special assessment levied to defray a portion of the cost of a parking facility, determine that the payment or, alternatively the levy of a special assessment, shall constitute provision of a designated number of parking spaces for the building or structure, and any future building or structure, located on the property specially assessed. The determination of the number of parking spaces deemed to be provided, if any, shall be made at the time that the special assessment is levied.*

Maximum Parking

The update also established a maximum parking standard, limiting the amount of parking that could be provided, as of right, at any new development project.

Maximum Parking. To minimize excessive areas of pavement no parking lot shall exceed the required number of parking spaces by more than twenty (20) percent, except as approved by the Planning Director. In granting additional spaces, the Planning Director shall determine that the parking is needed, based on documented evidence of actual use and demand provided by the applicant. All stormwater runoff created as a result of the additional parking area shall be completely retained onsite for any rainfall that is less than or equal to the 25 year, 24 hour rainfall. Stormwater facilities shall be reviewed and approved by the City's Environmental Services Department.[26]

Park Once Support

The 2008 Zoning Ordinance Update grants the City the authority to establish a "parking program… to develop publicly-owned district parking lots or structures as opposed to individually owned and operated parking areas". This has yet to be implemented as a central supply-expansion strategy. But, done comprehensively, the parking program made possible by the 2008 Zoning Ordinance Update, can ensure that parking supply investments promote smart, TDM-focused growth in Grand Rapid's commercial centers, primarily by emphasizing municipally-managed, public parking supplies over inefficient and redundant accessory parking facilities.

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[25] Grand Rapids Sustainability in the Zoning Code: Case Study. mml.org/green/pdf/GrandRapids_Zoning_Case.pdf
[26] Section 5.10.04.B.

Berkeley, California: Progressive In Lieu Fee Rate

The City of Berkeley, California recently adopted an In Lieu Fee policy, including a "graduated" fee scale, based on development size and the number of required parking spaces waived. A key advantage of a graduated fee scale is that it makes the fee option particularly affordable for infill projects, while creating an incentive for larger projects to provide on-site parking. This latter incentive can be particularly effective when combined with joint-development opportunities and/or zoning code provisions that encourage shared parking at private developments.

The fee schedule (and proposed uses for the collected funds of the program) were developed in a workshop with City staff and the Metropolitan Transportation Commission (MTC), as outlined below.

- $15,000 per space for spaces 1-5 waived or reduced,
- $20,000 per space for spaces 6-15 waived or reduced,
- $25,000 per space for spaces 16-25 waived or reduced, and
- $30,000 per space for spaces 26 and greater waived or reduced.

Such a graduated, or progressive, fee structure creates a strong incentive for "infill" projects to opt for the fee option, while encouraging larger projects, most of which will have sites more amenable to efficiently-scale parking facilities, to provide on-site parking. If complemented by a municipal parking program positioned to develop joint-use projects, with public parking in private development, this approach can be particularly promising.

San Francisco, CA: TDM Integration

In early 2016, the City and County of San Francisco adopted a resolution to initiate Code amendments that would require development projects to comply with a proposed TDM program, with the intent to reduce vehicle miles traveled (VMT), and to make it easier for people to get around by sustainable travel modes such as transit, walking, and biking.

The proposed TDM program is part of the Transportation Sustainability Program (TSP), a multi-agency initiative that aims to improve and expand San Francisco's transportation network to accommodate new growth. Under the proposed TDM program, the City would set a target TDM score, based on the number of accessory vehicle parking spaces included with the proposed project. Developers can meet the target by selecting TDM measures – each with a specified number of points – from a menu of options.

Figure 10   San Francisco DRAFT TDM Checklist

CATEGORY	MEASURE		POINTS
ACTIVE-1	**Improve Walking Conditions: Option A - B** Provide streetscape improvements to encourage walking.	●	1
ACTIVE-2	**Bicycle Parking: Options A - D** Provide secure bicycle parking, more spaces given more points.	●●●●	1 - 4
ACTIVE-3	**Showers and Lockers**	●	1
ACTIVE-4	**Bike Share Membership: Locations A - B** Provide a bike share membership to residents and employees for one point, another point given for each project within the Bike Share Network.	●●	1 - 2
ACTIVE-5A	**Bicycle Repair Station**	●	1
ACTIVE-5B	**Bicycle Maintenance Services**	●	1
ACTIVE-6	**Fleet of Bicycles**	●	1
ACTIVE-7	**Bicycle Valet Parking**	●	1
CSHARE-1	**Car-share Parking and Membership: Options A - E**	●●●●●	1 - 5
DELIVERY-1	**Delivery Supportive Amenities**	●	1
DELIVERY-2	**Provide Delivery Services**	●	1
FAMILY-1	**Family TDM Amenities: Options A - B**	●	1
FAMILY-2	**On-site Childcare**	●●	2
FAMILY-3	**Family TDM Package**	●●	2
HOV-1	**Contributions or Incentives for Sustainable Transportation: Options A - D**	●●●●●●●	2 - 8
HOV-2	**Shuttle Bus Service: Options A - B**	●●●●●●●●●●●●●●	7 - 14
HOV-3	**Vanpool Program: Options A - G**	●●●●●●●	1 - 7
INFO-1	**Multimodal Wayfinding Signage**	●	1
INFO-2	**Real Time Transportation Information Displays**	●	1
INFO-3	**Tailored Transportation Marketing Services: Options A - D**	●●●●	1 - 4
LU-1	**Healthy Food Retail in Underserved Area**	●●	2
LU-2	**On-site Affordable Housing: Options A - D**	●●●●	1 - 4
PKG-1	**Unbundle Parking: Locations A - E**	●●●●●	1 - 5
PKG-2	**Short Term Daily Parking Provision**	●●	2
PKG-3	**Parking Cash Out: Non-residential Tenants**	●●	2
PKG-4	**Parking Supply: Option A - K**	●●●●●●●●●●●	1 - 11

NOTE: A project sponsor can only receive up to 14 points between HOV-2 and HOV-3.

Image source: SFMTA

In general, if a project proposes more parking, then the target and number of TDM measures the developer must implement would increase. Selected TDM measures must be incorporated into the project proposal, and analyzed in Draft 1 of the Transportation Impact Study (TIS) or Transportation Circulation Memo. Property owners will be required to implement TDM measures selected in the TDM plan for the life of the project. The following image presents an overview of how this process fits into the overall development-approval process.

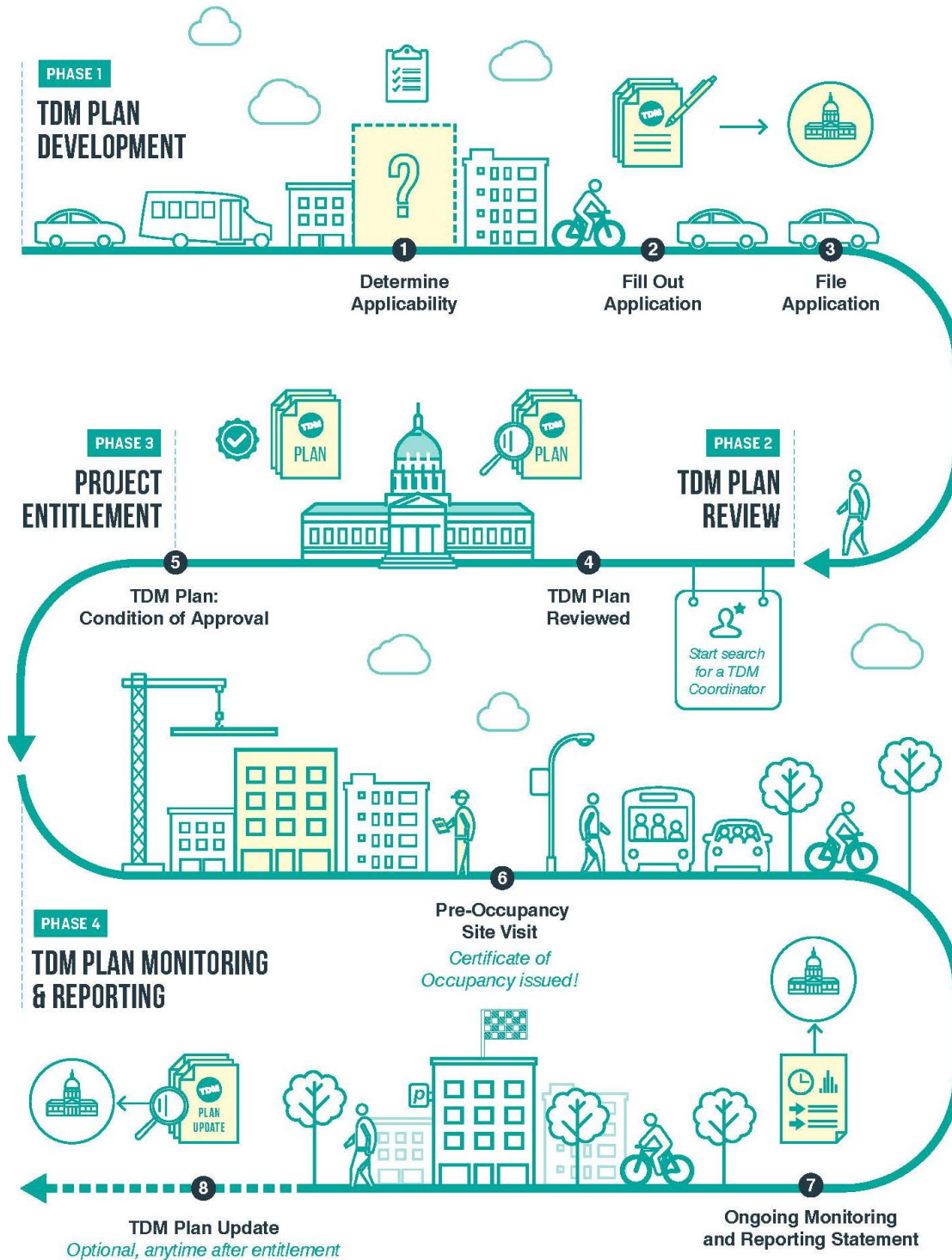**Figure 11   San Francisco TDM Approvals Process Overview**

Image source: SFMTA

Montgomery County, MD: Reduced Requirements for Unbundled Parking

Separating the cost of parking from the cost of housing is a highly effective means of reducing urban parking demand. This practice of "unbundling" parking from housing can also reduce housing costs within walkable, mixed-use urban centers that facilitate independence from vehicle ownership. This combination of opportunities tends to be particularly attractive to residents seeking to forgo car ownership, and those willing to do so to take advantage of the cost savings.

To incentivize this practice, and recognize its impact on parking demand, Montgomery County recently revised its zoning code to reduce residential parking requirements developments that include a commitment to offer parking only as an optional amenity, at an added cost.

Portland, OR: Bike-Share Station Credits

An on-site bike-sharing facility that is part of an established/recognized bike-share system, and providing 15 docks and eight shared bicycles, can reduce a project's parking requirement by three spaces. The requirement can be further reduced by one space for every four docks and two shared bicycles provided, up to a maximum of 25 percent of the required parking spaces. The bike sharing facility must be adjacent to, and visible from the street, and must be publicly accessible.

Note: Such a policy can be established before

Aspen, CO: Preparing for Uncertainty

The City of Aspen is preparing for a future of uncertainty with a zoning update that emphasizes flexibility, in part by moving beyond "parking requirements" to focus on mobility and access.[27] Requirements focus on access and mobility demand increases, associated with a project's proposed uses and activities, and allows developers three primary options for accommodating that demand.

1. Provide on-site parking.
2. Commit to on-site mobility amenities and/or TDM programs, beyond the minimum required for the project's Transportation Impact Analysis.[28]
3. Contribute funding to the provision of public parking, mobility, and TDM programs.

This is designed to generate _direct provision of private amenities and programs_, while also allowing developers to, instead _fund the provision of public amenities and programs_. The latter of these options, provided via a Cash in Lieu option, will generate revenue for the City to invest in parking, mobility improvements/expansions, or TDM, according to existing and anticipated needs. This allows the City to respond to changes in parking demand, mobility preferences, and transportation/sustainability objectives by shifting resources toward "right fit" solutions, as those options emerge and evolve.

[27] http://aspenpublicradio.org/post/aspen-looks-mobility-not-parking-way-future#stream/0

[28] http://www.aspenpitkin.com/Business-Navigator/Get-Approval-to-Develop/Transportation-Impact-Analysis-Guidelines/

SUPPLY EXPANSION THROUGH JOINT DEVELOPMENT

CONCEPT OVERVIEW

Joint development entails a partnership between a government entity or parking authority and a private developer to construct a new, privately owned/operated building or complex that incorporates a publicly owned/operated parking facility. Joint development has become a particularly favored option in locations where parking construction costs are high, and where urban design standards mitigate against most "stand alone" parking structure options. As multimodal mobility has become more commonly embraced by municipal parking managers, joint development offers more than just expansive and efficient on-site parking resources, to include intermodal connection points as well.

While a joint development process is more complicated for both parties, the potential upsides in favorable circumstances can make such arrangements highly valued. In particular, such collaboration can facilitate greater public support for a proposal than a stand-alone parking garage, or a private development with minimal/no parking would garner on its own.

Figure 12   Joint Development (Public Parking Under Apartments) – Ann Arbor, MI

OBJECTIVES & BENEFITS

- The private partner realizes greater overall parking capacity than was likely viable without the public partner.
- The public partner realizes cost savings though cost-sharing.
- Each gains significant access to overflow capacity — created when activity at some uses drops, coincident with an increase in activity at other uses.
- Area businesses and stakeholders realize an expansion of shared parking capacities.
- Improved facility design, which typically includes wrapping the parking structure with active land uses that maintain the continuity of public space and activity at the sidewalk level.

Figure 13   Joint Development – Asheville, NC

KEY ELEMENTS

Key elements of successful joint-development projects include the following.

- Mixed-use projects that benefit from allowing private developers to focus on their strengths (land use programming and design) and allowing the City to focus on theirs (parking and access)
- Sharing the cost and risks associated with significant infrastructure investments
- More, and more efficient, parking than either party could fund on its own
- Better design: No stand-alone parking facilities, but buildings "wrapped" in active land uses at the street level; more direct control of access points to reduce conflicts with pedestrian, bike, and transit networks
- Managed as part of a public parking program to provide a parking experience consistent with the rest of the system
- Jointly-financed but publically-managed, with as few spaces as possible set aside for specific land uses/ tenants

CONTEXTUAL CONSIDERATIONS

- Joint development will be particularly valuable in areas of high land values and construction costs, as well as areas in which the public and policy makers have high design expectations likely to resist stand-alone parking structure development.

- Where demand to maintain an attractive, walkable-urban environment includes pressure, or code requirements, to line parking with active land uses, public parking development may, by default, require a private partner.

- An established public parking system that offers a parking-provider partnership which can be relied upon to maintain an attractive and well-run facility, is essential to generating consistent private-developer interest in joint development, and maintaining leverage when negotiating arrangement for specific projects.

- The public entity must also have enough leverage, and policy-maker support, to ensure that all public parking spaces are maintained as a public resource, including a prohibition against discounts or other entitlements for on-site tenants.

CASE STUDIES

Below are a set of case studies involving joint-development that results in mixed-use development that incorporates public parking facilities that are managed as part of a coordinated public parking program.

Montgomery County, MD: The Flats at Bethesda Avenue

The Flats at Bethesda Avenue, located in Bethesda, Maryland, is a mixed use development on 1.4 acres of land, completed as a joint-development between a private developer and Montgomery County, through its Parking Lot District program. The project includes 162 residential units, 38 of which are affordable workforce-housing units. It also includes 28,000 square feet of retail on the ground floor, primarily occupied by restaurants and food and beverage retailers.

Figure 14   Joint Re-development, Montgomery County, MD

Image: Stonebridge Carras http://www.flatsatbethesdaavenue.com/gallery/

The County's primary goal for the development was to increase the public parking supply without creating stand-alone parking facilities. The County released a Request for Proposal inviting a private developer to propose plans to purchase two PLD lots, which contained 279 public spaces, and build 980+ public parking spaces underground, as part of a mixed-use development. The request stipulated the development of private residences and retail above the parking facility, as well as a requirement for 15% of housing to be offered as affordable units. The four-level underground garage that was part of the winning Bethesda Flats proposal is owned and managed by the County, while everything above it is owned and managed privately.

The Bethesda Flats project realized these minimum criteria, and brought benefits beyond these efficiencies, using location, programming, and design to emphasize non-driving mobility and access which allows the project to extract even greater value from each of its 980 parking spaces.

A distinctive point of appeal for the Flats at Bethesda is its location directly on the 11-mile Capital Crescent Trail. This trail connects with many other regional trails, and also feeds directly into Washington, D.C., which serves those who wish to commute to work via bicycle. When the development was built, the trail was widened from 10 feet to 14 feet along the development. Additionally, the developers implemented wider sidewalks and shorter crosswalks for an improved pedestrian environment. In addition to its direct trail access, the development also provides secure bicycle storage and a bicycle drop-off area to use while parking. The design of the garage takes into account both motorists and pedestrians, especially those carrying bicycles. Four of six elevators are oversized, allowing cyclists to easily bring their bicycles up to the Capital Crescent Trail. The garage also provides 24/7 security, energy-saving fluorescent lighting, six electric vehicle charging stations, wayfinding and signage, and hand-made art glass windows, all creating a welcoming, safe, and secure pedestrian environment.

Defining the optimal-outcome potential of the In Lieu Fee program, highlighting better-designed facilities that offer more broadly shared benefits, will clarify the intent of the ILF program, and encourage developers to rethink assumptions about the relative benefits of accessory parking. Thinking beyond parking, the joint-development model of supply expansion can evolve toward a means of implementing innovative mobility solutions, such as "Uber rooms"[29] and "bikestations"[30] that bring the same scales of efficiency and emphasis on shared benefits.

Grand Rapids, MI: Increasing Income Density via Joint-Development

For a relatively small city, Grand Rapids Mobile GR department – formerly Parking Services, rebranded to reflect a mission that was recently broadened to include mobility – manages a very large public parking inventory (~8,000 spaces). This is more than Detroit, which does not have a comprehensive public parking program, and more than Ann Arbor, which does. Despite this, there has long been pressure to expand this inventory to support robust downtown employment and residential growth. There are currently wait lists for monthly permits for several off-street facilities.

Over the last 10 years, joint-development has become the default model for building new parking structures. The last three parking facilities added to the Mobile GR system were built as joint developments, with the City building a parking facility incorporated into a privately-developed mixed-use building. This approach has allowed the City to expand its parking system, while avoiding "stand alone" parking facilities. As Mobile GR's director stated: "Our elected officials won't accept those anymore".

Furthermore, collaborating with private developers has ensure a high design quality and desirable use mix among the buildings in which the new facilities were built. Simply put, joint development has allowed the City/Mobile GR and their development partners to focus on their distinct areas of expertise, parking and building design/programming respectively, resulting in a more viable, attractive end product.

Primary Objective: Income Density

Mobile GR's primary objective for all new parking facilities is to increase "income density" – household income/square mile. That is key to attracting retail, which catalyzes live/work/play development investment.

Funding: Brownfield TIF

Michigan's Brownfield TIF[31] is a critical resource for these projects. The eligible costs for parking, are the largest eligible costs in the program. Private developers use that to get projects to "pencil out".

Key Challenge: Reserving Parking Spaces

Developers invariably want to have spaces set aside for their land uses/tenants, which reduces public parking capacities in the jointly-developed parking facility. Naramore recommends that cities strongly push back on this. "We are taking on all the risk, and developers, here anyway, are

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[29] https://www.washingtonpost.com/news/local/wp/2016/08/17/this-new-apartment-building-has-an-uber-room-to-wait-for-your-ride/

[30] http://home.bikestation.com/what-is-bikestation

[31] http://www.michiganbusiness.org/cm/Files/Fact-Sheets/BrownfieldProgramProcess.pdf

typically seeing a 30% return-on-investment for downtown development projects." By "overparking" the on-site uses, the City avoids having to build public parking elsewhere. But, this also reduces/removes risks to the developer, and ensures that parking will not be a barrier to securing financing. As such, there is no reason to believe that developers have to be given parking set-asides to insure their interest in collaborating on such projects.

Key to Success: Set Clear Expectations

Be clear about expectations, upfront, especially if it is publicly owned land. This includes clarifying what the City wants. Also be clear on the outcomes that people want to see. This can be less formal than a developer agreement. Sit around a table, setting clear expectations to be included in partnership agreements. "Throw everything out on the table."

- Is there a parking concession that the developer needs from the City?
- If residential uses are planned, how many reserved spaces will the developer need?
- How will the project be financed, and what role will parking play in securing this financing?
- How will the land sale work?
- Will the parties work with a master developer?

"I think we are getting better at it. There has been sea change at the City, as development success has increased confidence and leverage."