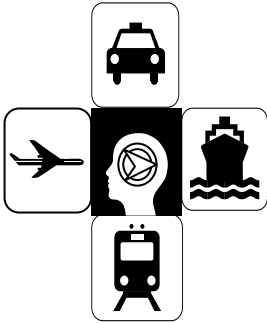


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## *Tech Brief*

### **Transit Friendly Parking Structure Guidelines: Planning, Design, and Stewardship**

FHWA-NJ-2007-002

June 2007

#### **HERE'S WHY THIS WORK IS IMPORTANT....**

Across America, any public discussion of downtown parking typically evokes controversy. This study focuses on the point in a community's evolution where that controversy becomes acute: when a community can no longer manage its parking needs with surface parking but must transition to structured parking, that point when a town begins to take on attributes of a city. This study seeks first to understand that acute controversy and then to identify best practices for developing structured parking in downtowns that focus on transit. It covers all aspects of the process from planning, through design and the stewardship of parking into the future.

#### **HERE'S HOW WE APPROACHED THE WORK....**

The study's methodology involved a multidisciplinary effort that utilized faculty and staff of NJIT's Departments of Architecture, Infrastructure Planning, and Civil and Transportation Engineering, assisted by Rutgers's Voorhees Transportation Policy Institute and the Urban Land Institute. Two graduate design studios, one at Rutgers and one at NJIT, focused student teams on different aspects of the problem. In addition, several symposia were held at which experts in the field commented on the process. Two related studies, the Urban Land Institute Advisory Panel and Parking Matters furthered the investigation of the subject. Work began in September of 2004 and concluded with the final acceptance of this report in June of 2007.

#### **HERE'S WHAT WE HOPED TO ACCOMPLISH....**

Transit Friendly Parking Structure Guidelines has three objectives: The first is to present current practice through a comprehensive, multi-disciplinary literature review; through consultation with experts at both the agency and professional levels; and by examining and documenting parking facilities in the field. The second is to offer conceptual designs of facilities at four locations in New Jersey and analyze their feasibility. From this experience, design guidelines and management standards, the third objective, were developed that utilize state-of-the-art practice, specifically tailored to conditions around New Jersey's transit facilities. These were imparted to NJ Transit staff and their consultants through symposia, this report, and a series of presentations. It should be noted that these parameters are finely tuned for the particular application in transit focused downtowns, even though some best practices are gleaned from places that do not fit this description. These guidelines and standards are organized according to three inter-related subject areas: planning, design and stewardship.

## **PLANNING**

Planning is a process that defines what a community needs, and establishes in general terms, what is possible. It begins with reconciling those needs with a community's environment. Planning also establishes the balance between quality and the ability to pay for it. More specifically, the planning process is comprised of many sub-activities that answer the questions associated with the WHO's, WHERE's, WHAT's, and HOW's of the project.

Primary amongst these is to identify **WHO** in the broader community must be engaged (municipal officials, citizens, and developers) and how to engage them successfully (through openness, proactivity, and leadership). The broader community must be involved in order to give a structured parking project the greatest chance of success. This cannot be underestimated as the flash points of developing structured parking are many: Parking is an enormous consumer of land, a scarce commodity in expanding downtowns and to build one requires substantial financial commitment. Structured parking is bulky and has negative connotations. This study advocates the use of charrettes and visual preference surveys as techniques that actively engage the community, foster openness, and gain community buy-in. This study uses two New Jersey examples as precedents, Princeton and Westfield, to compare one's town's success to the other's failure. Key to an effective process is openness to not only a project's opportunities but also its liabilities.



Subsequent to these are the issues of demand and capacity, and **WHERE** to properly locate the facility (which is dependent on land use practice, proximity to transit, and mixed use opportunities). While the additional traffic that a project will bring must be clearly understood, the potential for greater vitality must also be planned for. The land use patterns associated with downtowns, especially older ones, are typically complex in nature. While one seldom finds local zoning in these mixed-use environments that allows parking to be built as-of-right, there are three primary advantages to building structured parking there that can become proactive arguments for redevelopment planning or in pursuing a variance. First, mixed-use environments allow parking to be shared, which can minimize its size. Second, its massiveness can be mitigated or shielded when combined with other programs. Third, where a parking structure has multiple users, revenue generated by them, combined with adjacent development, can offset the ever increasing costs of development and help make a parking structure self-sustaining.

Parking demand in downtown environments is lower than typical suburban conditions, for which most current parking standards are based. Three reasons exist for this. First, the presence of transit in these environments reduces typical parking demand ratios based on the density of the downtown and the degree of transit service available. Second, downtown travelers also exhibit multi-purpose travel behavior where they park once and then walk to various destinations during their stay. This affects the parking demand of secondary purpose destinations such as restaurants and retail stores that serve persons that are in downtown for another primary purpose, such as work, a visit to a professional office or a residence. And third, shared parking is an emerging best practice that allows a significant reduction of parking supply through a complementary mix of uses. When different uses have parking peaks at different times of the day or week, the same spaces can be used to satisfy more than one use.

Shared parking spaces fall into three categories: first, those used by employees and residents, characterized by low turnover, longer stays, and familiarity with the system; second, spaces used by retail patrons and visitors, characterized by high turnover, short stays, and possibly unfamiliar users; and third, spaces reserved for use by individuals or particular use groups. Commuter



parking projects fall into the first and third categories. Housing represents an ideal complementary program for commuter parking with similar characteristics (low turnover, longer stays and familiar users) and exactly opposite peak demands times. The challenge is to capture as many of these users as possible in one parking facility.

A parking structure that is adjacent to transit is, by definition, an intermodal facility; essentially a park and ride. It can, however, be so much more than what we typically associate with park and rides: a parking lot next to a highway interchange. When parking structures are close to a train station, but not



too close, the path from them to the station and back again allows for commuter amenities. Commuters can split their errands for efficiency, dropping off (dry cleaning, orders, papers) in the morning and picking up (prepared meals, cleaning, mail) on the way home. As a mixed-use facility, the parking structure can also serve these same amenities and others, including retail, institutional and entertainment, and housing. The more vitality there is to a downtown, the less need there is to drive - for everyone; those living downtown would use their cars only when they need to depart, while other patrons can use the garage to park once and negotiate the downtown on foot.

Attendant to the issues of demand, capacity and location, are the issues associated with circulation (access and local traffic impacts) and specifying **WHAT** is the appropriate type for the facility. To design parking structures well, one must give as much attention to access for the vehicle as to access for the pedestrian. Where the portals are located, how they are controlled, and what streets lead up to them, each have enormous impact on the quality of the individual experience, and on the larger downtown environment. Sensing and communication systems technologies developed for parking structures increase efficiency, although they primarily benefit large systems and facilities, and have limited applicability to downtown structures. Devices exist to measure vacancies in an entire garage and even at individual stalls, information which can then be transmitted to users. Various communications systems are available that allow users to reserve or pay for parking through the internet, and increasingly, by using handhelds.

The quality of the parking experience must also be carefully calibrated. Similar to other transportation systems, this is measured, and planned for, as a “level of service.” Regarding a parking structure for its qualities is an uphill battle, as parking structures by default invoke considerable stigma. To counter this stigma, higher quality in parking structures typically translate to generous accommodation – higher ceilings, gentler slopes and shorter walking distances – which often lead to increased cost. Other level of service factors – being tailored to a specific user and location – can improve quality while not necessarily adding cost.

Finally, there are the issues of **HOW** to finance the project. Parking structures must typically charge a fee, given the need to control volume and because of the high cost of their development. Charging for parking also encourages transit use. How this fee is paid affects both the operation of the facility and the experience of the user. In a downtown environment, a municipality simply cannot cover the capital costs (design and construction) and operating costs (finance charges and stewardship) of structured parking without a reliable revenue stream. The cost of building structured parking is currently rising at a steady rate and the cost to amortize it would require monthly payments that are twice what commuters typically are willing to pay. Without a major change to expectations, it is critical that operators of commuter parking seek other users that can supplement revenue. The financing tools available to municipalities are revenue bond financing, tax financing, and qualitative/parking systems (otherwise known as enhancements/ supplemental financing).



## **DESIGN**

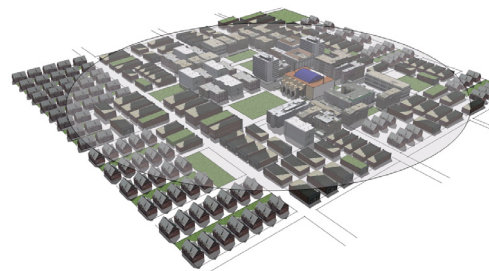
Once needs and possibilities are determined in the planning process, a project must be designed to satisfy those needs within the parameters chosen with regard to function, cost, the impact on surroundings and the quality of experiencing it. Design encompasses **engineering** – the determination of what the project is physically and how it is built, **urbanism** – how a project integrates and harmonizes with its immediate and broader environment, and its **architecture** – how all a project's constituent parts are coordinated to achieve the highest possible quality of experience.

Parking structures come in three basic types: open, enclosed and underground. Enclosed structures (above and below ground) typically are more expensive to build and operate because of added complexity and because they require mechanical ventilation and fire suppression systems. Four structural systems are typically used: cast in place concrete, post tensioned cast in place concrete, pre cast concrete, and structural steel. Parking structures are in effect extensions of paved roadways and are often subject to the same challenges.

**Urbanism** governs the overall design of downtown environments. How well a parking structure integrates with a downtown environment can be critical to its success. Urbanism today is a major component in **Smart Growth** planning strategies that seek to concentrate residential and commercial uses in downtown areas in order to combat suburban sprawl. These downtowns are intended to be compact, transit-oriented, walkable, bicycle-friendly, and include mixed-use development with a range of housing choices. Smart Growth planning is meant to be comprehensive and equitable, focusing on long-range, regional considerations of sustainability instead of short-term gain. Yet many correlate the density associated with downtown concentration with the negative side of becoming urban - crowding, crime and bad schools – without recognizing the positive aspects – amenity and choice. Because Smart Growth concepts are not universally agreed upon, implementation is measured by degrees – how many elements of smart growth a downtown exhibits. Sometimes, smart growth elements contradict one another, as they do with structured parking, where critics might argue that the provision of parking encourages driving over transit. These critics forget that Smart Growth maximizes choices and parking can be simply a choice, especially when priced accordingly.



The paradigm for Smart Growth downtowns is **Transit Oriented Development** or the Transit Village. This type of development typically surrounds a train station with relatively high-density, mixed-use development followed by progressively lower densities spreading outward from the center. Transit Villages are typically defined as a minimum  $\frac{1}{4}$  to a maximum  $\frac{1}{2}$  mile radius from a transit stop or a five or ten minute walk respectively. Structured parking can establish measurements similar to those of Transit Villages, generating its own radii based on the distance from parking to a retail destination or housing. Transit stations combined with structured parking can create powerful, bi-nucleic generators of high quality urban density. Even without the presence of transit, downtown parking can create significant adjacent density; some of the best examples cited in this report do so.



The attributes of Transit Oriented Development (TOD) are the **4 D's: density, diversity, design and destination**. Density refers to a consolidation of residential with commercial, office, institutional, or other activities. Diversity describes heterogeneity of land uses in downtowns, including retail, office and housing. These downtowns are populated by a variety of income, age and racial groups, and their

mobility options are maximized using a diverse strategy that counters the common practice of organizing land use in sectors (which typically requires automobile trips, not walking, between home, work, commerce, school, etc). Diversity as it relates to structured parking argues that it cannot be financially self liquidating unless it can share parking spaces with other uses. Design is primarily aesthetic and judged qualitatively. The design of a street or streetscape can make a walking trip seem far shorter than it is. Streetscapes are designed as metaphorical urban rooms where walls, ceilings, furniture and other elements complement one another. Destination refers to travel options. TOD must first and foremost be walkable if not bikeable. Necessarily, it need not be served by rail transit if good bus connectivity prevails. In this kind of environment, structured parking serves as a destination where visitors park once and walk to potentially multiple venues. Downtown Princeton NJ is an excellent example of a highly functional TOD that is not immediately adjacent to rail transit.



**Architecture** plays a critical role in the final “fit” of structured parking into downtown environments. Prior to WWII, garages were patterned on urban stables. In the postwar years, parking garages evolved into classic modern forms that reflected function and movement. Paul Rudolph’s Temple Street Garage, built in the 1962 in New Haven CT is an excellent example, designed as a monument meant to be seen. Today, attitudes have come full circle in downtown New Jersey, where parking structures are designed to be demure: “used but not seen.” To achieve this, some designers apply a thin veneer as camouflage to make garages look like housing or office buildings. Recently, some projects have sought to mitigate a parking structure’s presence not through disguise but by integrating with other uses. This study takes inventory of the constituent elements of a parking structure (interiors, portals, towers, and facades), identifies challenges and opportunities for each, and offers extensive recommendations.

## **STEWARDSHIP**

If well planned and designed, a downtown parking structure cannot ultimately succeed without effective stewardship. Stewardship includes activities associated with maintenance, revenue production, and security, as well as emerging practices of valet services and carsharing.

Parking facilities experience unusually harsh exposure conditions compared to most buildings. An effective maintenance program inhibits deterioration and prevents equipment failure. The three broad categories of parking facility maintenance are *structural*, *operational*, and *aesthetic*. Actions taken to perform maintenance for each category include routine and preventative maintenance and replacement.

Cost effective payment systems can enhance a parking structures ability to pay for itself and allow complementary uses. Facilities serving commuters and residential parkers are typically gated, utilizing some form of monthly payment system (magnetic, bar code, etc), to control access. For daily users - retail patrons or one time travelers - Pay on Foot is the current standard; only by pre-paying and surrendering a ticket upon exit can one exit the facility.



Keeping a garage secure is critical to its success. Parking facilities represent large volumes of space with limited activity, are open to the public, and contain many hiding places. Statistically, they are at higher risk of crime than many other uses. Security minimizes the actual or perceived risk in parking structures. Perception is critical; the more secure a facility appears, the more parkers will accept and use it. Crime Prevention through Environmental Design (CPTED) emphasizes how creative environments can reduce crime and enhance spatial quality. A security audit is the first step of the CPTED process. Security in its

passive form involves visibility and includes effective lighting, glass walled elevators and stairs. Active security is about response by employees such as security patrols and video monitoring.

Valet services and carsharing are several **emerging practices** in line with Smart Growth goals that enhance the transit parking experience. Valet services are often employed during the construction of structured parking, especially when the garage replaces a surface lot and its regular users are displaced. Once construction is completed, valet services can remain in place as a premium service and to maximize efficiency, particularly at shared parking overlap times, such as when arriving early may find no parking available. In this case, commuters can simply leave their cars curbside and a valet moves it later when space becomes available in the structure. Later, the commuter picks up their keys with a locator card and retrieves their own vehicle.

Car sharing is an emerging practice in urban areas across the US where cars are made available in a convenient location on an hourly basis without involving a typical rental arrangement. It has significant environmental benefits: fewer parking spaces are required to meet the same driving needs, lower fuel consumption results in less pollution as older model cars are replaced with newer models with better pollution controls, congestion is reduced as one shared car replaces more than six privately owned ones , and studies indicate mass transit use rises among car share users. Finally, car sharing promotes a deeper sense of community as members within a small geographic area share a common resource and because they no longer spend a significant portion of household income on car ownership, they often buy locally.

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A final report is available online at:

<http://www.state.nj.us/transportation/refdata/research/>

If you would like a copy of the full report, please FAX the NJDOT, Bureau of Research, Technology Transfer Group at (609) 530-3722 or send an email to [Research.Bureau@dot.state.nj.us](mailto:Research.Bureau@dot.state.nj.us) and ask for:

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