



APTA STANDARDS DEVELOPMENT PROGRAM  
**RECOMMENDED PRACTICE**

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# Transit Parking 101

**Abstract:** This *Recommended Practice* is an introduction to parking and transit, including the ownership, supply, location, management and design of parking facilities.

**Keywords:** environmental justice (EJ), intermodal connections, parking, transit, transit-oriented development (TOD)

**Summary:** Many, if not all, transit agencies have parking facilities, policies, management and related activities. Parking tends to be a complicated and contentious topic for transit agencies trying to accommodate existing customers, to ensure safe access to transit for all, and to use adjacent land efficiently to build transit-oriented development (TOD). This *Recommended Practice* includes a series of separate topic discussions on the main aspects of parking and TOD.

**Scope and purpose:** This *Recommended Practice* provides a comprehensive list of the topics and considerations that should be included in transit parking policies and programs and a brief, high-level discussion of each. These discussions are addressed to transit agencies evaluating parking strategies, investments and programs.

This *Recommended Practice* represents a common viewpoint of those parties concerned with its provisions, namely operating/planning agencies, manufacturers, consultants, engineers and general interest groups. The application of any standards, recommended practices or guidelines contained herein is voluntary. In some cases, federal and/or state regulations govern portions of a transit system's operations. In those cases, the government regulations take precedence over this standard. The North American Transit Service Association and its parent organization APTA recognize that for certain applications, the standards or practices, as implemented by individual agencies, may be either more or less restrictive than those given in this document.

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# Transit Parking 101

## 1. State of the practice

Since the 1960s, the United States revived and expanded the practice of building urban transit. Following the previous decades of auto-oriented development and behavior, there was often an assumption that the only way to access transit outside of the densest urban cores was by automobile trip. Consequently, it was automatic for many transit agencies to plan alignments and to build park-and-ride lots at the ends of lines/routes and at any interim place in order to accommodate auto access. The assumption was that without free parking, people in these new transit places would not find a way to use transit. Development around transit was rarely considered.

Over time, transit agencies have shifted to emphasizing other modes to access transit. In some cases, parking has become only one of the free access modes to be considered. In others, parking is provided but for a fee. Auto access is more often seen as primary at the final stop or station on a transit route or line when in the periphery of the urban area. It competes with, and is sometimes replaced by, other modes in more urban environments. The desire to have TOD as part of the regional portfolio of community types has added pressure to reduce parking. Providing parking, especially free parking, comes at a cost (maintenance, operations, forgone land value), which means having less money for the agency to spend on transit service and forgoing potential development revenue. Some regional planners are raising the question as to whether providing parking for transit, especially in places served by other modes, is compatible with policies for compact and connected development. Some new transit lines have been planned to prioritize putting stations in walkable and bikeable neighborhoods.

The recent drop in automobile ownership and use in the United States may, if the trend continues, further influence the debates on parking and transit. Consequently, this *Recommended Practice* should be reviewed every few years and revised to reflect changes, especially if the trend of lower vehicle miles traveled (VMT) continues.

Another reason to briefly outline existing parking issues and challenges is the changing state of research and best practices in parking. Recent studies of how parking is actually used and should be planned are influencing developments. Design of parking facilities has shifted to better architecture, more sustainable practices and more integration into urban places. Technologies allow better management of parking, better information for customers and car access separated from car ownership. This is a good time to outline transit and parking issues, to be sure that all of these are incorporated into best practices as transit agencies absorb the changing practice of parking.

Many parking issues are discussed in the sections below. All these issues have non-parking considerations that will impact the decisions. One of the most important is environmental justice, which is included in all sections. In addition, Appendix A is devoted to a case study of how to incorporate environmental justice considerations in a specific parking policy question. This document also includes a case study on the challenges of redeveloping parking space to transit-oriented development as an illustration of the complexity of transit parking.

The sections below are designed to be basic discussions of transit parking topics. Each of these topics could comprise its own document. However, the intent is to provide a comprehensive list of the topics and considerations that should be included in transit parking policies and programs. These discussions are addressed to transit agencies evaluating parking strategies, investments and programs. Although this paper focuses on the decisions concerning new facilities, these factors should be used in evaluating utilization of parking facilities. The cost per rider from each mode of access should be estimated in periodic reviews of the appropriate transit access strategy for each station.

**NOTE:** The term “station” is used in referencing the site of the parking facility for simplicity. This term should be read as including all transit locations that may or may not provide parking.

## 2. Transit agency considerations for providing parking access to transit

Transit trips begin and end with at least one other mode of transportation. People walk, bike, take a connecting bus or drive. Transit customers may use one or more of these modes at the beginning of a trip and other modes at the end of the trip. The assumption that parking facilities for auto access to transit should always be provided has given way to a more balanced approach to planning and building intermodal connections. Transit agencies are now planning for last-mile access for each station location, tailoring the investments to the particular needs of the place and the transit system. These first- and last-mile connections have only recently been studied and explicitly planned by transit agencies.

Although each transit access analysis is unique, reflecting the place and people who constitute the market for transit at that location, there are some general factors to be considered. Each transit agency can analyze the potential users of transit for a given station or stop and develop a plan of access for each mode based on that market perspective. Transit agencies serve transit riders; maximizing ridership per dollar invested is a major goal. This section discusses both positive and negative aspects of providing and managing parking for transit customers for both existing and new transit systems. Balancing these considerations is a form of benefit-cost analysis; each system and site will evaluate these factors differently. Whether the negative or positive aspects prevail is a policy decision. The list of considerations that should inform that decision fall into three areas: system, land use and environmental.

### 2.1 System considerations

**Parking is expensive.** Parking facilities, whether garages or surface lots, require significant capital costs in land, construction, lighting, drainage, utilities and structures. Moreover, each parking facility has ongoing operational costs for maintenance, lighting and security. Since transit budgets are limited, any money spent on parking is money not spent on new transit service, pedestrian and bicycle connections, or more frequent service. Parking may provide revenue directly if there is a charge for parking, but it is unusual for the parking charges to cover the operating costs, much less the capital costs. For many transit agencies, parking is the only service that is provided without a user fee or fare.

**Parking extends the reach of transit beyond the end of the line.** Transit providers frequently build parking facilities at the ends of high-capacity transit routes, so that people who do not have connecting local bus service can access the transit system. Parking is provided in more suburban areas to connect to transit as part of the effort to serve a larger area. This is particularly important in areas where some parts of the transit agency’s taxing district would otherwise not be served by transit. Creating a connection to transit for those areas demonstrates that transit options exist for a wide area, not just for the urban core. For these customers, the option of local bus service is not available, and only a parking facility can connect them to transit. This does not, by itself, mean that the parking should be free to the users. The argument can be made that the parking should be subsidized at the same rate as local bus service; whatever the average fare box recovery rate is on local bus service should be used to set a user charge for the parking. However, the costs of

collecting the parking fee including enforcement might exceed any potential revenues, especially if the transit agency doesn't have a uniform parking-charge system.

**Designing a system based on providing parking can lead to compromised transit alignments.** Parking lots are most cost-effective on low-cost land and easiest to access when located off of highways. However, the locations that provide the highest transit ridership — walkable, dense, mixed-use areas — generally have high land prices and are centered on local streets. Thus, locating a transit line so that stations are located where it is easy to provide parking may lead to the line being routed away from other areas that would actually serve more riders.

Providing parking as a default setting reflects thinking of transit as a specialized adjunct to a fundamentally car-oriented transportation system. By keeping the car as the default mode, park-and-ride-based transit encourages the continuation of development patterns and economic incentives that disadvantage transit. A transit system will be most successful if the surrounding land uses favor transit over driving. Transit riders are most likely to use transit if they can use it for all their trips, not just their commute, and they will get the most economic benefit from transit that allows them to sell one car, not just drive it a bit less.

**Parking provides less ridership compared with other access modes.** Across the United States, the transit systems and stations with the highest ridership are those that focus on pedestrian access and transit connections. In the United States, the light-rail systems with the highest ridership per mile — Boston, San Francisco, Houston — all focus on serving walkable locations and have few if any park-and-ride lots. Unlike other access modes, a car already occupying a parking space uses that space exclusively. Even on systems that provide a lot of parking, the stations with the highest ridership are those without parking. San Francisco's BART has 43 stations. Of those 27 (nearly two-thirds) have parking, but the stations that don't have parking account for two-thirds of system boardings. None of the top 10 stations in boardings provide parking. These stations have dense urban development with multimodal access instead of parking.

**Parking may expand choices for disabled riders.** Some disabled riders have their own vehicles and would prefer to drive to a transit facility. In that case, parking could be a complement to paratransit service to access the transit station.

**NOTE:** We recognize that not all paratransit systems connect customers to fixed route or rail service. For those that do, this consideration is included as an important aspect of the overall provision of services to disabled riders.

**Parking may reduce ridership on other transit services.** For example, within a major bus transit service corridor, providing parking at a train station is not generally in the transit agency's interest. The parking would incentivize people to use private auto access to the station instead of the local bus service. When fewer people use the bus service, it's harder to justify frequent service. If service is reduced, then all riders on the service suffer, and car owners are even more likely to drive to the parking lot. A transit agency that provides parking at a station well-served by connecting transit is competing with itself, not generally a good business model.

## 2.2 Land use considerations

**Parking displaces other land uses.** Every station has a potentially walkable zone in the quarter- to half-mile from the station. Everything within that zone is potentially accessible to transit riders. The more activities — office, retail, housing, education, cultural facilities — that are within that zone, the more transit riders have access to, and the more ridership the station will have. Every parking facility occupies space that could be put to other uses. A surface parking lot can fit approximately 120 cars per acre, which would, if completely full, yield about 150 to 160 boardings per day. At a more normal utilization rate of 80 percent, the ridership would

likely be in the 110 to 120 boardings range. Parking garages displace less land per parking space than a surface lot, but they are more difficult to adapt to other uses and more expensive to replace. A medium-density apartment complex at 40 units per acre would likely yield 120 to 130 boardings per day. Moreover, apartments or other private development, unlike transit parking, generate property tax revenue. In many areas served by transit, parking is not the highest-value land use adjacent to a station. (Ancillary benefits of people walking instead of driving to transit, such as health, safety, fuel consumption, etc., would also be much larger for the apartment development scenario as compared with the parking lot scenario.)

**Parking can be an interim use while preserving land for future development.** A parking lot can serve as a land bank for future facilities or transit-oriented development. This is especially true in high-growth or directed-growth areas, where land may not be available in the future. Land banking can be a very good investment for transit agencies. However, unless the goal of land banking is widely understood and accepted, proposals to use the land for any purpose other than parking may elicit pushback from the users of the parking. This is a fairly typical case of the existing use having proponents, while the proposed future use lacks anyone to represent that interest. This risk factor is especially important if the proposed future use does not happen for years while people get very used to having the parking facility.

**Park-and-ride may encourage sprawl.** New park-and-ride facilities at the outskirts of metropolitan areas provide commuters with an alternative to congested freeways. This may actually encourage more development in these areas and, depending on land prices and regulations, this new development could be the standard suburban low-density development, placed on streets that do not allow efficient local bus service.

**Shared parking can enable mixed-use transit-oriented development.** In many places, the cost of developing parking required for development is a barrier to getting the development off the ground. If the transit agency can provide, or participate in providing, structured parking, the development can create a revenue stream for future transit as well as accommodate parking for both the development and transit access. Many land uses, such as retail, restaurants and entertainment, have maximum parking demand at times when transit-parking demand is low. Thus, the same parking space can serve multiple people during the course of a day, and the cost can be split among the different uses, making the development more economical. Shared parking is sometimes challenging in that the timing of the need for parking in a development may not match the transit agency's ability to plan and construct parking. It is more likely that the transit agency builds parking in advance of the TOD, or that the transit agency invests in the parking structure constructed and managed by the private development.

**Parking may discourage walking to the station.** Surface parking lots are inherently unfriendly to pedestrians, even if well designed. Pedestrians want shelter, safety, visual interest and surrounding activity. Even if a potential rider is within walking distance of a station, the obstacle created by surface parking may cause him or her not to choose transit, or to choose to drive a very short distance to the parking lot.

**Parking may have significant traffic impacts on surrounding neighborhoods.** Large parking facilities serving rush-hour commuters will have heavy traffic volumes during the morning and afternoon, while general traffic routes are most congested. This can overwhelm neighborhood streets and even major arterials, slowing down buses, bicyclists and neighborhood traffic. Even if access roadways are widened to accommodate these flows, the wider streets can be deterrents to pedestrian activities. The ingress and egress points will inherently be congested at peak times. One of the deterrents for charging parking fees is exactly this challenge of getting almost all the cars into and out of the parking facility during the short peak time period.

## 2.3 Environmental considerations

**Parking has local environmental impacts.** Parking lots can displace habitat, increase stormwater runoff, add pollution to local streams and create a local heat island effect. Parking also generates local emissions by generating more local traffic. Although any development will have some environmental impacts, surface parking as usually constructed lacks any of the mitigations used in vertical developments. Park-and-ride lots increase impact per capita. The car has one parking space in its home; if that car has another space in the park-and-ride, then there are two parking spaces per car, paving over twice as much land.

**Parking may reduce regional environmental impacts.** Where parking reduces VMT, the parking reduces regional environmental impacts such as emissions and other associated negative externalities. In these cases, park-and-rides can be part of regional environmental mitigation strategies.

**Parking may reduce regional congestion.** Another reason to provide parking at the ends of routes on high-traffic corridors is to lessen congestion on roads in the corridor during peak traffic hours. If some of the auto traffic can be diverted to a park-and-ride lot with those people switching to transit (or, if capacity allows, carpool/rideshare) for the most congested part of the trip, then the drivers who continue to drive get the benefit of fewer cars on the road. (This is an example of transit providing benefits to people who don't use transit.) However, it is worth noting that transit that does not provide parking can still have significant congestion benefits, since people who had been driving to work may choose to live close to transit so they do not use their cars for the trip to work.

Parking can reduce congestion only if there is not an offsetting induced demand for roadway space. If the park-and-ride lot reduces congestion, additional developments are often built along the now less-congested corridor. Over time, congestion rises again and no long-term congestion reduction is realized.

**Parking may be in conflict with environmental justice considerations.** In general, transit agencies are careful to prioritize serving those who can't or don't drive private automobiles. However, parking facilities are often in areas where the population is higher income. Consequently, parking facilities serve more affluent users but are typically paid for by all users. Transit agencies should review all proposed parking facilities in terms of who is served, at what cost, and what alternative use of funds might benefit more people. Underserved communities should not wait for improved transit while more affluent communities get additional parking facilities without a compelling and detailed case made for that decision.

**Parking is sometimes an unequal subsidy to a subset of riders.** Few transit systems recoup the full cost of providing parking through parking fees. Thus, systems that provide parking —especially systems that provide free parking — are providing more subsidy per rider to riders who park and ride than to riders who walk or bike to the station. In many places, park-and-ride users have higher household incomes than average riders, which raises environmental justice issues.

**Parking may accommodate shared vehicle uses.** Some transit facilities provide parking for carpools and vanpools. Increasingly, car-share services (Car2Go, Zipcar, etc.) are given designated spaces in parking facilities. These parking spaces support transit-oriented communities, create opportunities to use automobiles more efficiently, reduce auto ownership, and reduce single-occupancy trips.

## 2.4 Summary

In all cases, parking must be seen as part of a larger multimodal strategy for access to transit, both today and tomorrow. The factors driving the decision to provide or not provide parking will differ by the context of the system, the corridor and the station. Transit agencies need to analyze each station's potential ridership by all access modes. There are always competing goals and limited resources. But, in general, agencies should consider riders per dollar of access mode investment, as well as alternative uses of those funds. When parking

facilities are provided, the decision should reflect consideration of all the costs and benefits, both short and long term.

Transit provides an important service for existing riders. In most areas, the growing demand for transit options means that transit agencies have to be even more efficient in building and operating services in the future. A balanced approach to parking facilities as only one investment in transit access is a key part of planning future transit.

### **3. Identifying stakeholders and their roles in parking decisions**

Parking decisions are not made in a vacuum, and a number of actors are responsible for different roles related to the development of parking, whether as part of the transit agency property or as part of the development of standards that govern parking rules in a region. This section discusses the role those stakeholders play in the development of all issues related to parking.

The actors with an interest in transit parking are made up of five major groups:

1. Existing and potential customers/riders of the system
2. Actors related to the function of the transportation provider
3. Actors related to the functions of the community
4. Actors related to the function of real estate
5. Residents and business owners

#### **3.1 Existing and potential customers/riders of the system**

The first group of actors is those who make up the ridership base of the region's transit system. This doesn't necessarily mean the core system of buses and trains, but ultimately all riders of various systems. This might include those who use park-and-ride lots for various functions, including vanpooling, casual carpools, or people who are parking to use the agency service. These actors have different needs determined by their individual use of the system and are key to determining the placement of parking properties and facilities.

##### **3.1.1 Transit customers arriving by automobile**

Transit customers who arrive to use the system by parking automobiles are those who use the parking properties provided by the transit agency inside the system. Some of them will live inside the service area, while others may drive from outside to use services available at parking facilities. Understanding these customers' preferences and needs is important to determining the number of parking spaces that are needed and to attract more riders.

##### **3.1.2 Private high-occupancy-vehicle customers using parking facilities**

Parking facilities are often used by high-occupancy vehicles that can include but aren't limited to vanpools, carpools and private transit. Vanpools and private transit are often company-run services that sometimes use public facilities. These services use the parking facilities to store vehicles and to get rides to locations that the transit system may or may not service. While some of these uses may not be allowed at certain transit properties, it is important to understand how they fit into the overall system and its use.

##### **3.1.3 Disabled riders**

Disabled riders have specific needs at parking lots and facilities related to the Americans with Disabilities Act (ADA). These riders and the rules of the ADA will influence the design of parking facilities, including the placement of spaces as well as ramps and other design considerations that make access to the system from private vehicles easier.

## **3.2 Actors related to the function of the transportation provider**

The second group is actors related to the agency or department providing transit services. Sometimes that can be the regional transit agency, and other times it could be a part of city government infrastructure. The people who work in this sphere are tasked with developing plans that meet the future goals of the transit agency while also working to implement current service. It should be noted that often there are multiple transportation providers with opportunities for cooperation and possible conflicts.

### **3.2.1 Parking managers/operators**

Transportation providers that own parking facilities often have to manage and operate them. This might be done through a private operator, but it might also be the transportation agency's responsibility. For the transportation agency, maintaining the facility including the transit stop by keeping it clean and functioning is an important part of the operations and will cost money.

### **3.2.2 Security personnel**

Security personnel are responsible for determining safety and security on transit properties. They will often have an opinion about the design and implementation of safety protocol at facilities such as parking lots, garages and related uses. In this instance, security personnel can include facility designers, lawyers and safety experts. Understanding the strengths and weaknesses of this set of people is an important consideration. Additionally, safety personnel such as guards and monitors can be employed to watch over the facilities from a security perspective.

### **3.2.3 Maintenance workers**

Maintenance professionals are in charge of upkeep of transit properties. Their opinions should be sought when designing parking facilities. Materials and design can determine long-term operations and maintenance costs; however, those maintenance concerns should not force design into a corner.

### **3.2.4 Transit agency/county transportation planners**

Transit capital and service planners are in charge of planning long-range transportation investments, which could include park-and-rides as well as access planning to bus stops. Usually working in tandem with traffic engineers, this group could decide how many spaces are needed and what issues are related to driving buses and trains on the streets of a city. Additionally, this group is likely to have some say in access and egress matters related to buses and bus stops on city roads and facilities.

Additionally, transit agencies might be involved in land banking for future projects, as well as redevelopment of agency-owned land. The tradeoffs include a balance of ridership and return on investment through redevelopment compared with ridership and revenue from the current parking supply. This type of planning will many times be done in coordination with city planners.

### **3.2.5 Coordinating agencies**

State and regional agencies such as metropolitan planning organizations (MPOs) are major sources of transit funding as well as coordinators of federal funding sources. These agencies can be a big influence on design decisions and policies that lead to the construction or maintenance of parking facilities.

### **3.2.6 Federal agencies**

Federal agencies such as the Federal Transit Administration (FTA) are often major sources of transit funding and have rules that are attached to grants. Federal agencies have the ability to set best practices and also to require the use of ridership models for transit projects that depend on riders from parking spaces along the lines. For example, requiring certain target ridership from conditions existing on opening day, which includes

park and rides, will encourage the construction of parking. If the ridership models are not allowed to use estimated ridership from planned development to be counted in the models, the need to qualify for federal project funding will bias the decision towards park and rides and against future TOD. Additionally, federal agencies such as the General Services Administration have parking policies for property owned at the federal level.

### **3.3 Actors related to the functions of the community**

The third group with a stake in transit parking is made up of those with an interest in the functions of the city or region. These are generally public servants charged with determining city policy related to the development of parking standards within development codes. However, they can also control city-owned parking assets and land that might be necessary for the development of transit-related parking facilities. Each can have a different role during the process; however, some may have more control than others.

#### **3.3.1 Elected officials**

Elected officials can include mayors, city council members or regional officials. Because of the feedback they get from constituents and the power that the parking conversation has, elected officials often are the public face of city staff decisions and agreements between transportation providers and city agencies. They are often charged with making final decisions and have to weigh both the practical and political issues related to the subject. Elected officials outside the service area are likely to have a say as well. State legislators, as well as elected officials who are board members of the MPO, have peripheral interests in the agency and will have constituents who work inside the service area.

#### **3.3.2 City/county staff and planners**

City or county staff often work for elected officials to coordinate and develop legislation and policies related to parking. They can be tasked with meeting with stakeholders and putting together research briefs documenting best practices as well.

City planners are tasked with implementing city development policy through regulations and codes, while also looking at future plans and opportunities. Their jobs can include researching and writing parking codes, permitting related to parking regulations included in development codes, and neighborhood planning that includes parking supply and demand issues.

The city is frequently responsible for non-auto infrastructure, such as bike lanes and sidewalks. The city usually manages on-street parking and residential parking permits near transit stops as well. Planners are also charged with supporting larger investments through planning goals and bigger-picture thinking. Looking at the larger planning picture and coordination are important to successful outcomes.

#### **3.3.3 Economic development officials**

Economic development officials are responsible for encouraging economic growth in a community through many means, including the recruitment of new businesses and the growth of existing ones. They are involved in helping develop long-range plans and might negotiate the terms for developing property where new businesses could possibly locate. Because parking is such a big issue to employers as well as employees and customers, these issues will likely come up in meetings pertaining to business growth and friendliness. Location incentives can include transit access.

#### **3.3.4 Traffic engineers and modelers**

Traffic engineers recommend and set standards for parking based usually on integrated traffic modeling that shows how much traffic and parking is needed for any given development. Parking requirements are often the result of how different land uses are modeled in this system. Additionally, traffic engineers can be responsible

for determining the level of service for streets, and many times street widths and off-street access for parking. Modelers also have recently become more involved in performance pricing related to parking issues.

### **3.4 Actors related to the function of real estate**

Real estate professionals have a very important role to play in that they are responsible for not only adhering to existing rules and regulations regarding parking, but some of them are also responsible for perpetuating existing conditions due to continuing risk factor avoidance.

#### **3.4.1 Realtors and real estate brokers**

Realtors and brokers are responsible for helping residents and businesses buy and sell real property. For them, parking is a value and asset they can sell. However, as more and more value is put on walkability and proximity to amenities, they will play a role in helping to determine value from uses that require less parking. Additionally, as they become more educated about parking policy and related issues, they can be educational liaisons to buyers and sellers who might not know how parking and transit usage and service are intimately related.

#### **3.4.2 Real estate developers**

Real estate developers are involved in large infrastructure decisions and partnerships with agencies and jurisdictions to provide facilities. They are often putting together projects and can be involved politically with major infrastructure through professional organizations and campaign activity.

#### **3.4.3 Adjacent property owners**

Owners of commercial or residential properties adjacent to transit facilities are responsible for leasing existing property and building new buildings on owned property. The wants and needs of a property owner are often a reflection of the wants of tenants and future buyers. Understanding how parking and transit affect their business is key to their ability to make their properties successful.

#### **3.4.4 Financiers**

Financiers such as lenders and banks are often seen as the party insisting on over-parking new developments. If a forward-thinking developer wants to do a project in a city with lower parking ratios, banks will sometimes reject financing based on comparables in that sub-area. They tend to be conservative and are not as willing to take risks with bigger projects. Increased experience with successful developments that have reduced parking generally ameliorates this concern.

### **3.5 Residents and business owners**

#### **3.5.1 Neighborhood residents**

Whether it comes from new development or existing businesses, parking issues loom large in redevelopment fights, and residents are typically most concerned. Neighborhood residents also have a stake in understanding parking policies and how they can impact them.

#### **3.5.2 Businesses**

Businesses are often concerned about parking from two standpoints. One is from employees seeking access to work, and the other is from customers seeking to patronize the business. Business owners can have a significant impact on parking policy from both standpoints and can be deeply affected by changes one way or another.

Any decision about parking facilities will need to have a strategy to appropriately involve and accommodate the relevant stakeholders. Some of these stakeholders will have compatible interests, and some will have

conflicting ones. It's also important to review the stakeholders identified above and those that may have been left out, to ensure that relevant stakeholders have been represented. All too often, only a select group of stakeholders contribute to the decision-making process at the expense of other perspectives.

## 4. Initial planning considerations

Planning for parking at transit stations needs to occur at the beginning of the overall transit planning process. Design and acquisition decisions will be significantly impacted by shifts in parking demand over time and how those should be accommodated. Redesigning or retrofitting stations adds costs and can delay implementation. Possible future need for a parking management program should be factored into the planning decision.

Access studies that can help identify the costs and modes of access to the transit service as well as surrounding development need to take into account recent and anticipated trends in trip making and not rely on traditional or outmoded assumptions. Where possible, developers of projects in the served areas should fund these studies. However, the transit agency needs to have a role in carrying them out. As stated above, this needs to be done at the earliest possible time.

Determining the amount of parking that should be provided at stations and how this may change over time requires several considerations, detailed in the following sections.

### 4.1 Catchment area

Most customers whose trips start or end within 10 minutes of the station will walk, though there may be some bicycle riding and driving. However, beyond this point, the mode split can be impacted by several factors:

- The quality and extensiveness of bicycle infrastructure and connecting transit service.
- Policies or goals (transit system and/or municipality, region or state) regarding mode split. However, the weight given to policies or goals should be relative to the availability of resources to provide the infrastructure and services that will enable meeting goals and policies. Absent such commitments, assume current conditions.
- Absent policies or goals, what is the likelihood of increasing connecting transit service or improving bicycle infrastructure?
- How will the catchment area change over time? There is no need to provide parking for future growth at opening, but there is a need to consider how customers of future development will access the station and whether more parking will be needed in the future. A plan for how the additional parking will be provided should be part of the initial planning and design of the station.

### 4.2 Cost implications

Consider the relative per space costs of providing parking: surface, above ground, below ground. Consider the operating and maintenance costs of the parking facility. Compare with the revenue and ridership projections and other advantages of a multimodal access strategy.

### 4.3 Funding issues

The parking facility can be a considerable investment, and there is not a one-size-fits-all funding formula. Instead, a variety of issues should be considered, including the following:

- For new systems, anticipate parking as part of the overall network construction.
- For existing systems, determine whether parking will be restructured, replaced or expanded.
- For structuring ownership, consider the following options: transit agency owned, leased with a private construction partner, ground leased with a joint developer or sold outright to a separate party.

- For long-term financial sustainability, identify operating costs as part of the capital cost recovery.
- For attracting outside funding, be strategic and opportunistic (“grant ready”) by addressing supportive grant-eligible priorities, such as social equity, sustainability, economic development and local community goals.

#### 4.4 Current context

In addition to serving transit customers, parking is a land use that may have impacts on the local environment. Context-sensitive planning around a parking facility would consider the following:

- urban design, scale and character of the surroundings
- the current and proposed roadway capacity leading to the parking facility
- current available parking supply adjacent to the station
- parking programs to protect the non-transit users around the station (e.g., parking meters or permits)

#### 4.5 Joint development

The parking demand of the development will need to mesh with the demand for transit customers. Parking minimums imposed by the governing municipality may have to be adhered to, though the transit agency in partnership with the developer should advocate for effective transportation demand management measures (e.g., no parking minimums and for the amount of parking provided to be determined by market conditions).

One interim strategy for a new joint development pursued by some jurisdictions is the “proof of parking” option. In this case, the development is designed with the reduced parking constructed in the initial development. Some area is reserved for future parking need should the reduced parking prove inadequate. This area can be a greenspace adjacent to the parking, or a contingent lease arrangement, or other assurance that there is a fallback if the reduced parking forecast is inaccurate.

If joint development is not part of the initial station design but will be in the future, then some thought should be given to how parking will be accommodated during construction of future joint development, what other access modes should be prioritized in conjunction with parking, and how transit parking will be accommodated once development is complete. A joint development partnership provides opportunities to share some of the costs identified previously. (Details of how parking will be accommodated during construction and after can’t be determined until details of the development are known.)

#### 4.6 Accommodating growth and change

The demand for the fixed guideway or trunk transit services serving the station will change over time. Many different factors can influence demand: tolls, fuel prices, parking supply and/or price at non-home destinations, construction projects creating short-term increase in demand, demographic trends, changes in land use at destination points, growth in residential development at the home end of the trip, and attainment strategies for local and regional mode splits. Since these factors can’t be predicted with pinpoint accuracy, scenario planning may be the best approach. By identifying multiple possible scenarios, strategies can be devised for each. The immediate decision in terms of design, property acquisition, etc. should be made with flexibility in mind so that the transit agency and community can respond to whatever scenario actually unfolds. The key to successfully determining the amount of parking that needs to be provided and at what point it needs to be provided is to find the sweet spot between 100 percent non-auto trips and not deterring any potential transit customer who will access transit only by auto. The other critical factor is to make sure transit and non-transit parking needs in the station area are addressed.

## 5. Determining where parking should be provided

Cited in this section are the fundamentals of *location* to consider in planning, designing and evaluating parking facilities to support transit investments. This includes parking facilities that serve transit riders directly, as well as parking facilities that support the mixed uses in a TOD.

### 5.1 Transit station or stop function along the transit corridor

As transit stations or stops range in distance from the main urban centers, the times of day and the main reasons that a transit stop is used also will vary. This has a direct effect on the ways parking facilities at the stop are used. For example, parking that supports access to an end-of-line stop at the edge of an urban area, where the primary point of access is by automobile, will likely be more critical to that stop's ridership and would have more marked "peak" periods of use than a downtown stop.

### 5.2 Transit station context

The local access, street and transit network, the density and mix of land uses, and the local economic conditions surrounding the station area factor prominently in the role and supply of station parking, as well as the parking for transit-oriented uses depending upon the transit station. A walkable area surrounded by dense development will likely support robust ridership with less parking than one in a comparatively undeveloped location. Also, as the mix of land uses may create demand at different times of the day (midday shopping, schools, theaters, workplaces) that can support multiple uses of one parking facility rather than separate facilities that are underused at differing times of the day. Safety and comfort are key to successful mixed-use, intense access zones; transit agencies must ensure that the paths of cars destined for parking avoid the mixture of sometimes-frantic pedestrian circulation (between transit vehicles, to and from transit and destination) and sometimes distracted, leisurely paced pedestrians already at their destination that typifies many transit stations and transfer locations.

### 5.3 Network service characteristics

Supplying parking for a transit station or supporting adjacent TOD should depend on the service characteristics of the transit system itself. A commuter rail service with limited hours of operation and greater headways between runs should not be expected to justify or sustain the reduction in parking for adjacent mixed-use development that a more frequent, higher-capacity heavy-rail system would. Similarly, reductions in parking provisions for adjacent land uses should also be guided by how "robust" the transit service is.

### 5.4 Land values and development trends

Parking at transit stations or stops may be seen as a temporary use of land, especially surface parking lots that can be later developed for other uses. With changes in local economic pressures, zoning allowances, community planning support, lending structures, construction costs and land acquisition opportunities, the decision to transition a parking lot to other land uses may shift away from the original "temporary" designation. It is also possible that the decision to build parking that is regarded as permanent may shift as market conditions change over time. One possible resolution of the planning tension between parking and TOD has been to adopt a station development strategy of buying cheap land for parking and "banking" the land for station area growth as the market warrants.

If the parking is sited to anticipate future development, a concept plan for that development should precede the park-and-ride. This plan should include consideration of the future street pattern, utilities, and vehicular and pedestrian circulation. The placement of parking can anticipate future synergies with planned or existing mixed-use development.

## 5.5 Local politics and community plans

Market trends, station-area land use characteristics, and station function might all be lesser considerations in how much parking is needed at a transit facility than local politics, as approvals for local development and transit investment typically require local government approvals. Considerations of the public position on such matters as traffic conditions, new development, new trends in commuting and overall automobile use, gentrification, changing demographics, etc. are factors to consider and anticipate, especially in communities with histories of civic activism and engagement and strong links to local elected officials. Typically, engaged, active citizenry get “ahead” of the issue by adopting local plans to control and direct growth, including the traffic-related issues linked to parking supply for transit stations. These plans may or may not reflect the current data that sometimes surprise elected officials and community leaders with the correlation between parking supply, transit stations and traffic congestion. As such, they represent opportunities to revisit and update planning precepts and community expectations.

## 5.6 Local demographics and environmental justice considerations

Distinct from local politics are the expectations of the community surrounding the station site. A transit-dependent neighborhood with low rates of automobile ownership would not see abundant parking as having the same value as a more auto-dependent community, especially if the provision of parking obstructs station access by other, more valued modes of access. Similarly, parking that entices more remotely based drivers to travel through and impact a low-auto neighborhood underscores how little benefit locals get from the transit facility. Placing and expanding parking facilities for transit stations in higher-income neighborhoods has raised environmental justice questions: Is the transit agency spending more for “choice” riders than for transit-dependent riders? Is there a trade-off between spending money on parking at the expense of other uses of the funds, such as increasing service?

Taking a longer-run view, consider the overall demographics and trends within the neighborhood of any proposed site: The transit facility will last a long time, after all.

# 6. Implementation considerations

## 6.1 Management

Management of the parking facility should be handled by the owner of the parking facility or by a vendor contracted to perform this service. Management activities include coordinating all the functions listed in this section, as well as being responsive to users of the facility and the surrounding community

### 6.1.1 Operations

The following operational issues must be considered:

- **Safety and security.** All transit parking facilities should have security plans and appropriate budgets for security operations. Many places use motion-detector cameras, with local law enforcement personnel dispatched as needed. Whatever security is chosen should be clearly communicated to customers. Lighting can improve safety during nighttime hours. Facilities may install motion-detector lighting so as to conserve energy during the hours when the facility is, or should be, empty. Universal design is required for all transit facilities; parking facilities should be especially careful to accommodate everyone. In addition to the usual accommodations for disabled drivers, the facility should be safe for all pedestrians whose paths cross the roadway. All pedestrians, including those who do not walk quickly, should be able to cross drive lanes safely.
- **Insurance.** If a transit agency carries insurance for parking facilities, then the cost of that insurance is part of the cost of operating the facility. If the agency self-insures, then an implicit cost should be estimated and included in the operations cost.

- **Utilities.** Lighting, access control and customer facilities will all require use of local utilities.
- **Monitoring.** Parking facility management should have a monitoring program in place to better understand the usage of the facility and compliance with agency goals. It is recommended that cleanliness be monitored as well. Structural integrity audits and preventive maintenance should be completed by parking engineering professionals and should be documented.

## 6.1.2 Owning vs. leasing

The typical model is for transit agencies to own and operate the parking facilities, despite high capital and operating costs. In some cases, it might be advantageous to enter into a lease or shared agreement with a compatible land use. One common strategy used is to lease parking spaces from a land use with parking demand periods outside of the weekday business hours, like a church or cinema. Another strategy is to lease parking to mitigate temporary construction impacts to an existing park-and-ride lot. Benefits of leasing parking instead of owning it include increased flexibility to meet shifting transit markets, less impact on the capital budget, and reduced environmental impacts from new construction.

Challenges with leasing park-and-ride spaces include fluctuating prices over time, locations not ideal for ridership or access, staff time needed to manage negotiations and contracts, and a risk of lease cancellation. It should be noted that, in some circumstances, the private sector might provide parking available to transit riders without a formal agreement with the parking lot owner.

### 6.1.2.1 Partnerships with public or private entities

In some places, a transit agency may enter into a joint development agreement to provide district parking in combination with transit parking. Building a single larger parking structure allows economies of scale in construction and operation. The effect of lowering the cost of structured parking may significantly increase the ability of the private market to create good TOD around the station. The transit riders may provide customers for the development; the development provides conveniences for the transit riders. Management of the parking facility depends on the structure of the agreement. Transit agencies can benefit from these kinds of partnerships but should realize that the time horizon for the private development community is usually much shorter than for the transit agency. All agreements should consider preserving options for adaptation to future conditions.

## 6.2 Operational issues

### 6.2.1 Maintenance

The following maintenance issues must be considered:

- **Waste disposal.** Handling and disposing trash is part and parcel of maintaining a parking facility. Management should ensure that the parking and waiting areas are cleared of trash and debris daily. Waste of this kind will likely need to be stored onsite in a container designated by the waste disposal company. A location that does not conflict with vehicular, transit or pedestrian traffic will need to be identified for this container. It is recommended that this container be emptied weekly at a minimum.
- **Landscaping.** Landscaping at these facilities should meet public space safety regulations and the regulations of the municipality in which the parking is being provided. Of the utmost concern to transit operators is safety for the operator, vehicle and customers utilizing the facility. Bushes must not be large enough to allow potential criminals to hide behind. Trees and bushes must not protrude into the drive lane where buses or other transit vehicles are operating, lest conflicts between the two arise. While green spaces are welcome and attractive features for parking facilities, pedestrian connections must not be compromised to provide them. Once installed, landscaping must be maintained on a schedule that adequately matches the climate of the region.

- **Costs.** All parking facilities require ongoing maintenance and repair, including trash pickup, snow removal, asphalt repair, restriping and signage. The costs of these activities should be factored into decisions concerning parking facilities.
- **Customer and operator facilities.** Additional facilities that may be needed in a parking facility include break rooms for transit personnel, restrooms that may or may not be public, and possibly vending machines.
- **Structural repairs.** Any facility should have plans for possible structural repairs, whether due to unforeseen factors or aging. Most transit agencies self-insure for these repairs; the implicit cost of that insurance should be included in the facility costs.

### 6.2.2 Security/enforcement

Enforcement of free-to-user facilities primarily consists of towing vehicles left too long in the facility. Many facilities require all cars to be removed daily; others allow longer-term parking in certain areas. Towing is a problematic mechanism in locations that are remote from other uses. If a transit customer returns to the parking facility and finds that his or her vehicle has been towed, being far from anything may be a safety problem.

In fee-for-use facilities, enforcement mechanisms can include towing but primarily consist of increased charges. There is an additional concern in that payment collection systems may require someone to be available to respond to problems. Again, the location of the facility will influence what mechanisms and operations are appropriate.

### 6.3 Pricing

When parking for transit is well planned and demand for transit is high, many parking facilities will experience high utilization of parking, often filling lots early in the morning with commuters. One method to accommodate better utilization of the parking and potentially more equitable access to limited parking resources without building new supply is to manage the parking with pricing. The transit agency can achieve various goals using parking pricing, including limiting parking for transit use only, offering incentives for HOV parking, encouraging non-auto access to transit, discouraging overnight parking, encouraging higher turnover and generating revenue.

Most transit agencies using parking pricing implement a nominal fee, but using market-based pricing can increase the odds of achieving efficient parking management. Successful parking pricing schemes pay close attention to the different markets for access to transit, including progressive-hourly, daily, monthly, short-term, long-term and sharing with adjacent land uses.

Finally, parking pricing is best implemented when backed by a transit access policy that can set policy goals for mode split targets, spillover concerns, local partnerships, equity issues and revenue allocation. Some of these issues could require cooperation between the transit agency and local jurisdiction. Appendix A provides a case study of how BART approached a change to its parking policy, which included parking charges.

The following are additional issues related to pricing at park-and-ride facilities:

- **Parking facility monitoring and management.** The transit agency can charge a higher rate for premium parking stalls, or those located nearest to the actual transit stop or the elevators. In addition, agencies can incentivize carpool parking through a reduced parking charge.
- **Time shifting.** In large park-and-rides that experience an early morning rush, charging for reserved parking stalls can help spread the load on peak-period transit service by allowing some customers to arrive later with the assurance that a stall will be available. It can also help alleviate local congestion from vehicles accessing the site at peak periods.

- **Technology.** Pricing of parking can introduce challenges for facilitating the transaction. It is recommended that transit agencies consult with a parking operator and explore the latest technologies available to ensure smooth operations of the parking facility when accepting fees. Some parking facilities are using real-time parking supply monitoring and communicating the information to the users before they enter the facility, either through signage or on a web/mobile platform. There may also be opportunities to integrate a parking charge with the transit agency's smart card.
- **Enforcement.** Enforcement is often cited as a barrier to charging for parking. Some of the challenges of efficient enforcement include administrative costs, legal limitations and policy implications. With any pricing program, proof of payment needs to be considered. Providing gated entry is a straightforward way to ensure that everyone pays, but it could lead to delays in ingress and egress as vehicles queue behind the gate.
- **Revenue.** Although parking can generate significant revenue in higher-demand markets, some transit agencies are restricted in setting rates by state law. In some cases, agencies are limited to charging a rate that will cover only the cost of administering the program. There may be flexibility in these rules by defining the program as a comprehensive transit access strategy where parking fees are applied but the revenue collected is invested back into the station area through bicycle, pedestrian and other transportation management improvements that support multimodal access to the station. This approach, similar to a parking revenue district, can also help garner political support for introducing parking fees.

## 7. Design and construction issues

### 7.1 Design

The decision to include parking at a transit facility presents challenges in design and construction. At the outset of design, it is advantageous to convene all stakeholders to best understand the issues and expectations of all participants in the process. It is also possible at this time to note the principal parameters or program of the parking facility. Then, at milestones throughout the design process, evaluate the evolving design based on the stated parameters and objectives. Stakeholders can be engaged and should be kept informed in the development of a station area plan. Stakeholders can be kept informed about the process, allowing them to review and comment on the evolving design.

Safety and security need to be foremost considerations for the park-and-ride customers, their property and the surrounding community. This entails adequate lighting, minimal obstructions, clear sightlines, etc. However, the design should not negatively impact the adjacent community; issues like glare, noise, etc., should be addressed sensitively. Reference Crime Prevention Through Environmental Design standards.

Careful attention to size, geometry and site placement will ensure a more efficient and economical design. Plan the ingress and egress to prevent congestion during peak flow times. Place the circulation paths of both pedestrians and vehicles to avoid conflicts while maximizing the opportunity for connectivity among the modes, such as bikes, buses, cars, and rail or bus stations. Site the parking facility to integrate the parking levels into the topography, allowing it to be a part of the landscape if it is in a hillside area. The design of the parking facility should include appropriate vehicle technology accommodations and incentives to promote sustainable modes of access.

Parking at transit facilities may be built on the surface or within multilevel structures. This decision regarding type of facility may be influenced by the transit system. Bus or rail systems and size of the available sites or the required capacity of parking will be factors in the decision. A sensitive facility design is shaped to appear related to its surroundings in scale and materials.

Based on the type of facility to be designed, surface or structure, principles of sustainable design should be incorporated. The site design of the facility can adjust to the site location's topographic features, minimizing impacts on the natural terrain. This limits the need for retaining walls and permanent stormwater construction such as culverts. To the extent possible, the design may provide for the natural dispersion of stormwater. Opportunities to dispose of storm runoff using natural landscape such as bioswales and rain gardens can make the parking project more sustainable.

Landscaping provides an attractive visual element in at-grade parking lots and serves as both a visual and sound buffer between cars and pedestrians. Minimizing paved surfaces reduces stormwater runoff. When designing for paving and paths, the use of materials with a solar reflectance index that reduces the heat island effect will further enhance project sustainability.

In a multilevel facility, design features that incorporate street-friendly uses, such as ground-floor retail shops, offer conveniences to commuters. Recently, multilevel parking facilities have incorporated other activities, such as community, cultural and entertainment spaces to promote more active use of the facility at nontraditional times, such as evenings and weekends. Incorporating other uses within a parking structure brings additional users to the site, creating a more active environment.

It may also be prudent to plan ahead when preparing the facility design should the area around the parking structure develop over time. The layout of the facility and the structure may be designed for adaptive use into a mixed-use project at a later date, thus capturing the parking within an onsite development. In such instances, part or all of the parking facility may be incorporated in a TOD project.

## 7.2 Construction

During the construction of transit parking facilities, take steps to ensure safety to customers entering and leaving the site. Plan to monitor construction to ensure that safety procedures are followed, that temporary signage directs transit customers between modes, and that transit users are informed about progress and upcoming work that may impact their daily routines.

To minimize inconvenience to existing transit users, the construction phases can be reviewed in advance so as to anticipate any potential activities that will delay the process or cause interruption to customers. If advantageous, the facility can be constructed in phases, allowing for partial occupancy of completed areas prior to the completion of the entire project. This may relieve congestion caused by lack of parking options during the construction phase.

Throughout construction, it is important to monitor contractor compliance with standards for minimizing the impacts of noise and site erosion on the surrounding area. Temporary signage can inform station users about work in progress and direct them to the safest and most protected circulation paths. Outreach to stakeholders with updates throughout the construction process informs users about the progress of the work.

At the conclusion of the project, step back and evaluate the design and construction process to note lessons learned. Such recorded information will provide valuable insight for initiating projects of similar scope and context in the future.

The basic goal is to ensure that site design at each station should satisfy its operational demands and integrate satisfactorily into the surrounding urban fabric. Site design adheres to the architectural concept of a systemwide cost-effective approach to design.

## 8. Conclusion

As evidenced by the previous sections in this *Recommended Practice*, the broader station area context should always be taken into account when planning for parking near transit. Successful transit-oriented communities right-size the supply of parking and manage both off- and on-street parking as a system, balancing the local community's parking needs while not providing barriers to transit use. Coordinated planning, regulation and management of non-transit parking are critical to a successful TOD.

There are multiple considerations when planning for parking near transit, including the ownership, supply, location, management and design of parking facilities. Ideally, these factors should all be addressed through collaborative public/private planning efforts at the station area scale, either through a station area plan or a parking management plan. Considering that parking investments are costly and long term, any potential increase in parking supply should be considered in relation to the vision for the station area. The land use and transportation vision for the area can be tied to parking through mode-split goals. Once the community understands how residents, employees and visitors will travel to and from the station area, appropriate parking strategies can be applied that will help realize the vision. This is where the opportunity exists for collaboration between the transit agency, local jurisdiction, real estate community and other partners.

Considering that parking is expensive to build and can consume valuable land near transit areas, it is sometimes better to manage existing parking rather than to build new parking. Management strategies are intended to encourage more efficient use of parking while improving the service provided to the user. Best practice indicates that the most effective management strategies include pricing, sharing, facility design and transportation demand management.

First and foremost, both on- and off-street parking should be priced and unbundled when possible, giving the user a choice to use parking or not. Pricing can help achieve multiple goals, including better management of space, meeting mode split goals and collecting revenue to recoup facility costs and for investing in other purposes. When considering pricing for parking, it is critical to consider environmental justice and social equity impacts. A case study in Appendix A illustrates an approach that BART took when setting a new parking policy that included changes to the fee structure.

Another emerging strategy includes the sharing of parking among different land uses and sites. This strategy is especially relevant to station areas that are transitioning from suburban to urban areas, as it offers the flexibility to accommodate short-term parking needs without building expensive new supply. Facility design can be used to make better use of existing space, including accommodating more vehicles, bicycles and other uses like storage.

Finally, transportation demand management (TDM) programs can be effective in promoting flexible parking and alternative modes, like transit, through incentive-based programs. Effective TDM programs include parking cash-out, car/ride sharing, transit benefit programs, and information and marketing.

This *Recommended Practice* provides a comprehensive summary of issues relating to parking near transit. Parking is a complex issue, with strong arguments for and against incorporating it into a transit station area. Most importantly, this report should help guide the user in asking the right questions about a particular parking decision. It is intended to be a summary, with the assumption that planning for any specific parking site would require a much more in-depth exploration of each issue. A list of additional resources is provided in References at the end of this document. In addition, Appendix A and Appendix B provide three case studies to help the user understand how some transit agencies are dealing with real-world parking issues in complex environments.

## Appendix A: Parking policy environmental justice — a case study

FTA requires that transit agencies identify and address, as appropriate, disproportionately high and adverse impacts on human health or environmental effects of programs, policies and activities on minority populations and/or low-income populations (collectively “EJ populations”). This requirement applies to all policy and program decisions, including those concerning parking. The following case study illustrates the application of EJ considerations in a parking policy decision.

### BART’s EJ analysis of proposed system parking program and policy

It has been common practice for transit operators to provide free parking at their facilities. However, it is no longer financially and environmentally sustainable for transit operators to continue providing free parking, so many have implemented parking charges, not only to help cover the cost of operating and maintaining these facilities, but also as a transportation demand strategy for regulating and managing parking supply.

There is ongoing concern that the implementation of parking charges can have disparate impacts on environmental justice communities, otherwise defined as transit customers who can least afford to pay for either new parking charges or increases in existing parking charges. Therefore, when BART began to discuss a potential change in its parking program and policy that would lead to an increase in the parking charges, the district had to make sure that these changes would not disproportionately impact its lower-income customers. Failure to perform appropriate analysis and to seriously consider the potential impacts to the EJ communities could result in the loss of significant federal and state funding for transit projects and potential lawsuits by affected communities.

In 2003, BART implemented daily parking fees at its stations with parking facilities. Of the 44 BART stations in the four-county service area, 33 have parking facilities, while the remaining 11 are in heavy urban areas where space is limited and parking facilities cannot be accommodated. Daily parking charges are collected at 26 stations.

BART had a parking fee policy for its West Bay stations that set minimum rates and allowed for increases in the daily parking rate charged. The West Bay parking policy set its daily parking charges at the following levels:

- \$1 if fewer than 50 percent of parking spaces were occupied.
- \$2 if between 50 and 90 percent of parking spaces were occupied.
- \$3 if more than 90 percent of parking spaces were occupied.

At the time, there was no mechanism to adjust daily parking fees beyond \$1 per day in the East Bay (West Oakland is the exception at \$5 per day). In order to cover the costs of providing parking, as well as to help improve BART’s service and infrastructure, BART proposed a demand-based parking program for its East Bay stations. Similar to BART’s West Bay parking policy, the new parking program would increase or decrease parking charges at stations based on parking demand. This program would raise daily parking fees by 50 cents at station parking lots that exceed 95 percent capacity. If the lot is less than 95 percent full, then the fee may decrease by 50 cents. Parking lot usage would be evaluated every six months, and the daily parking fee has been capped at \$3, except at West Oakland.

Changes in parking fees required that BART conduct an EJ analysis to determine if the proposed East Bay parking program would create an adverse impact on low-income and minority populations who park at the East Bay BART stations.

## Considerations

The patrons who park at the 33 stations with parking facilities were potentially subject to the increases or decreases in parking fees resulting from the proposed parking program. The demand-based approach for daily parking fees would apply equally to all stations in the BART service area. Since the proposed program pertained to parking charges, the analysis focused on BART parkers, and not all BART customers.

The goal of this demand-based parking program was to maximize BART's parking fee base by a predictable pattern of adjustments, while retaining ridership. Through past experience, BART had found that small fee increases were easier for riders to absorb. In 2009, the daily parking charge at the Daly City Station was raised from \$2 to \$3. This \$1 increase proved to be too large and resulted in a decrease in ridership from Daly City. Subsequently, parking charges at Daly City were lowered to the original \$2 parking charge in 2010. Therefore, a 50 cent incremental increase appeared to be easier for riders to absorb than a \$1 increase.

Data can come from a variety of local, regional, state and federal sources. BART relied on the comprehensive 2008 Station Profile Study — with more than 50,000 survey responses — to understand how its customers get to the station and their demographic makeup relative to race, income and age. With this information, BART was able to define low-income households as households with income under \$50,000. Non-minority includes only those who are white alone (single race) and non-Hispanic. Minority includes everyone else (Hispanic, non-white and/or multiracial). The study helped BART identify which stations had more minority and low-income parkers who could be potentially impacted by the fee increase.

## Methodology

To assess the impacts of parking charges on minority and low-income parkers, BART determined the average parking charge paid by minority, low-income and overall parkers at each BART station. The following formula was used to determine parking charges paid:

- Determine the total number of parking spaces per station.
- Identify percentage of minority and low-income parkers per station (from the 2008 Station Profile Study).
- Based on this percentage, determine the number of parking spaces utilized by minority and low-income parkers.
- Determine the average current parking fee, projected parking fees for 2015, and projected parking fees with \$3 price cap at East Bay stations paid by minority, low-income and overall parkers.

BART also used the following assumptions to estimate future daily parking charges:

- current fill time of parking facilities
- size of waitlist for monthly reserved parking
- demand for single-day parking permits
- various strategic benefits of a particular station (transfer point, near downtown San Francisco, near highway, terminal station)

Using the methodology listed above, BART performed three different analyses based on the scenarios of the 2015 projected fees, a \$3 price cap and unlimited fees, or no price cap to determine if an increase in parking fees resulting from the proposed parking program would create an adverse impact on minority and low-income parkers.

## Outreach

A survey was distributed to the public to seek feedback on the proposed parking program. The survey asked questions about residents' parking preferences, including how much they would be willing to pay for guaranteed parking space. The survey was conducted throughout the BART service area to both the general public and specifically to low-income, minority and limited-English-proficient populations.

The survey was distributed through the following means:

- notices posted on all parking machines at stations that charge daily fees
- email sent to all who use reserved parking
- more than 600 community business organizations in four counties BART serves
- email sent to limited-English-proficiency advisory group
- email sent to elected officials and government administrators of all cities and counties BART serves
- message display on BART platform digital message system
- press release
- Facebook, Twitter, Bart.gov banner, BART.gov/parking web page
- displayed on Clipper signup page
- covered by local and regional print, TV and radio media
- translated surveys available upon request
- one public hearing at BART board meeting

## Survey conclusions

The survey concluded that the proposed market-based parking program would not result in an adverse effect on minority and low-income parkers when compared with overall parkers. The parking fees paid by minority and low-income parkers were virtually identical when compared with overall parkers. Therefore, mitigation would not be required for this program. It was approved by the BART board in February 2013. All revenue generated from these new fees will be placed into a special account to be used only for programs for improved station access, including shuttle and feeder service to stations and much-needed station rehabilitation and modernization, further ensuring that these fees will provide equitable access for all BART customers, including those in the EJ community.

In 2014, the BART board approved the use of parking revenue for last-mile access improvements throughout the BART district. These improvements help address the concerns that the increased parking charge would have an adverse effect on the EJ communities by improving transit, pedestrian and bicycle access to the stations.

## Innovative parking strategy to address displaced transit station parking

The displacement of transit station parking to make room for TOD is often a great concern for transit customers, who will have to make decisions about where to park and whether to continue using the same station, as well as local residents, who worry about spillover parking into their neighborhoods. In the case study at South Hayward BART Station, where a sizeable amount of parking has been eliminated to make room for a TOD project, BART is undertaking an innovative parking strategy that involves the district, city of Hayward and the community.

In June 2011, the BART board of directors approved the sale of BART's 1.65 acre property on the east side of Dixon Street to a developer. This site currently accommodates 174 BART parking spaces. A 357-unit residential project will be built on property owned by the developer as well as the BART property. To address the loss in parking that would result from the development, the BART board authorized the execution of a joint powers agreement (JPA) with the city of Hayward for the South Hayward BART Station Access

Authority. The purpose of the JPA is to provide oversight and decision-making for the new parking program at the general policy direction from the City Council and BART board of directors.

The JPA, in addition to appointing officers and adopting bylaws, reviewed and approved a scope of work for an access study to be conducted by a consultant under the direction of city and BART staff. Construction by the developer cannot begin until the JPA has approved an access plan.

In March 2012, a meeting was held with the local community to discuss the TOD project and the potential loss of BART parking. Not surprisingly, the residents expressed concern that the loss of BART parking would lead to the potential loss of on-street parking in front of their homes, the potential imposition of a parking permit program on their neighborhoods, and other potential negative impacts on parking and traffic from the development project. Based on this feedback, city and BART staff reexamined the preliminary access study findings to identify replacement options that would not adversely impact the residents and would be more responsive to their concerns.

The access study included the following findings and recommendations, which will be referred to collectively as the action plan. The city and BART must approve various aspects of the action plan.

**Parking capacity and needs.** BART patron parking currently averages 1,379 spaces per day (1,080 in the main BART parking lot, 174 spaces in the Dixon Street lot and 125 unregulated on-street spaces around the station). The preferred alternative from the Action Plan includes 1,362 parking spaces or 99 percent of existing demand (1,090 spaces in the main BART lot, 142 spaces on Tennyson Road, 40 spaces on Mission Boulevard and 90 spaces on Dixon Street). Currently, there is no parking allowed on Tennyson Road or Mission Boulevard, so the majority of the on-street parking would not adversely impact existing residents. The preferred alternative also includes a transit-oriented development preferential residential parking permit program that was approved by the city in February 2013, whereby residents would receive up to four parking permits at no charge and BART patron on-street parking would be restricted to Tennyson, Mission and Dixon. The program prohibits BART patron parking on certain city streets, the designation of 272 spaces on city streets for BART patron parking, and the imposition of parking fees for such spaces consistent with the proposed parking fees for spaces on BART property and related implementing actions.

**Parking charges and modification metrics.** Currently, almost all parking, both off-street and on-street, is free for BART patrons. The exception is 39 spaces in the main BART parking lot that are reserved for monthly parking at \$42/month, and only 19 spaces are reserved at this rate. The action plan recommends that a paid parking program administered by the JPA be established along the following lines:

- **A daily parking fee** of \$1 should be charged to initiate the program. Based on BART history, a parking charge of \$1/day has had little long-term impact on parking demand. This charge would be applicable to approximately 982 of the spaces on BART's main lot and all of the approximately 272 designated spaces on city streets within the modified boundaries of the JPA. Daily parking fees would be applicable Monday through Friday from 4 a.m. to 3 p.m. The daily fee would increase in 50-cent increments up to a maximum \$5/day following the metrics described below.
- **A monthly parking fee** of \$42 should be charged to initiate the program. This would be commensurate with both the existing monthly fee at the station and the \$1-per-day charge. Approximately 74 spaces, or approximately 7 percent of the main BART lot spaces, would be reserved for monthly parking and would be contained entirely within the main BART lot. The monthly fee would increase to \$63 per month when the daily fee becomes \$2 per day and increase to \$84 per month when the daily fee becomes \$3 per day.
- **A daily reserve parking fee** of \$3 should be charged to initiate the program. This would be applicable to approximately 32 spaces, or approximately 3 percent of the main BART lot spaces. The

daily reserve fee program would be contained entirely within the main BART lot. The daily reserve fee would increase to \$4 per day when the daily fee becomes \$2 per day and increase to \$5 per day when the daily fee becomes \$3 per day.

To initiate the paid parking program, both the main BART lot and designated parking spots on city streets would be striped and numbered. Appropriate signage, both enforcement and directional, would be added to the BART lot and along city streets. Parking validation machines and add-fare machines would be installed within the paid area at the BART station to ensure that individuals parking on BART property and within the numbered spaces on the city streets of Tennyson, Mission and Dixon are BART patrons.

The impacts of pricing both on-street and off-street parking facilities would be analyzed and adjusted every six months to help achieve the desired parking occupancy, to generate sufficient funds to cover the cost of introducing and maintaining the parking program, and to create a fund source to introduce more sustainable access improvements in the future. The metrics to modify the various parking charges would be as follows:

- If occupancy is greater than 98 percent, then the daily fee would be increased by 50 cents per day.
  - If occupancy is between 90 and 98 percent, there would be no change in fee.
  - If occupancy is less than 90 percent, then the daily fee would be reduced by 50 cents per day.
- However, the minimum parking fee would be no lower than \$1 per day.

**Capital costs.** There are initial capital costs that would be incurred to implement the JPA paid parking program, including striping and numbering parking spaces, installing enforcement and directional signage, acquiring and installing Clipper card reader and validation machines within the BART paid area, and installation of safety fencing on Tennyson. The total capital cost would initially be absorbed by the city and BART. However, both the city and BART would be reimbursed by the JPA over 20 years at a low interest rate for these expenses.

**Operating costs.** There would also be initial operating costs that would be incurred to implement the JPA paid parking program, including parking enforcement, as well as maintenance of the parking facilities and validation machines. Although BART and the city would initially absorb these costs, the intent is to have the JPA pay these expenses once revenue is received from the parking charges. If the JPA determines that it would be more cost-effective for the JPA to contract for these services, then city and BART staff would discuss this matter and would give notice to their unions as may be required by collective bargaining agreements. The JPA would retain all parking revenue from the parking program to cover its operating costs and reimburse the city and BART for capital costs.

**Financial analysis.** A 10-year cash flow analysis was conducted, and the access study estimated an annual surplus, which could be invested in future access improvements at the South Hayward BART Station. However, in the event that parking fees remain unchanged during the 10-year time frame, annual deficits could be realized. In that event, the city and BART would need to identify options to reduce the costs (e.g., rather than have the JPA be responsible for paying for parking space maintenance, both the city and BART could retain the maintenance responsibility). Both city and BART staff expect the operation of the paid parking program at the South Hayward BART Station to be financially self-sustaining and that it will result in net revenues. The access study further identified a number of potential access improvements, such as enhanced walkways and electronic bicycle lockers at the station that could be funded by future surplus.

The details of the program are currently being developed and implemented. While it is too soon to arrive at any conclusions, it is worth noting that the city and BART were able to successfully work together and engage the community in the creation of a TOD parking strategy.

## Appendix B: Innovative shared parking in Seattle — two case studies

Shared parking provides a unique opportunity for public transit agencies to reduce land dedicated to parking, to promote the development of sustainable communities, and to reduce costs. King County Metro Transit has implemented several shared parking arrangements; this appendix discusses only Northgate.

Northgate is a major urban hub for the King County Metro Transit system. Today there are 1,500 parking spaces and more than 5,000 daily boardings. Light rail is expected at Northgate in 2021, and boardings are projected to increase to 15,000 by 2030.

Metro Transit has shared agreements with Simon Properties and with Thornton Place.

### Simon Properties

In 2006, Simon Properties embarked on an expansion of Northgate Mall in part because of the city’s plan for revitalizing the Northgate neighborhood. The expansion plans included a new outdoor “urban-village” on the western end of the mall facing Interstate 5. This village opened in November 2007 and also includes a large structured parking lot (**Figure 1**). King County Metro Transit uses two of the five floors of this garage for shared park-and-ride spaces.

**FIGURE 1**  
King County Metro Transit Parking Structure



King County has a 20-year lease of 280 park-and-ride stalls in the garage constructed by Simon Properties. Simon Properties was paid \$2.5 million in a single lump sum for the 20-year lease. In addition, the county will pay \$44,780 per year, adjusted annually for inflation, for Simon to operate, maintain and secure the leased stalls. The garage is north of the existing Transit Center and adjacent to the Northgate Mall in Seattle. The lease term guarantees the county 20 years of occupancy with the option to extend for two 10-year terms subject to the consent of Simon. The garage opened for park-and-ride use in late 2007.

Exclusive access to the 280 stalls on the bottom two levels of the garage is available to commuters between 5 a.m. and 9 a.m. on weekdays. The county will have shared use of these stalls after 9 a.m. on weekdays. Both stair and elevator access to the stalls will be available. Park-and-ride users will have use until the end of the evening commute.

The county will have the right to extend the lease for two additional 10-year periods, unless Simon, subject to a two-year notice, elects to terminate the lease at any time after the initial 20-year term. The \$44,780-per-year operations payment will require Simon to maintain, repair and secure the garage. Simon additionally agreed to indemnify the county for any liability arising from the ongoing operation of the garage. Simon paid the prevailing wage to contractors employed for garage construction.

## Thornton Place

In 2009, the Thornton Place development (**Figure 2**) opened. It was built by a consortium including Stellar Holdings, Lorig Associates, Mithun, Era Living LLC, the city of Seattle, King County Metro and other partners. This project partnership resulted in a sustainably designed, mixed-use urban village. It features 109 ownership units, 278 rental units, 143 senior units, a 14-screen movie theatre, and 50,000 square feet of retail and dining space surrounding a lively outdoor plaza with al fresco dining and a water feature.

**FIGURE 2**  
Thornton Place



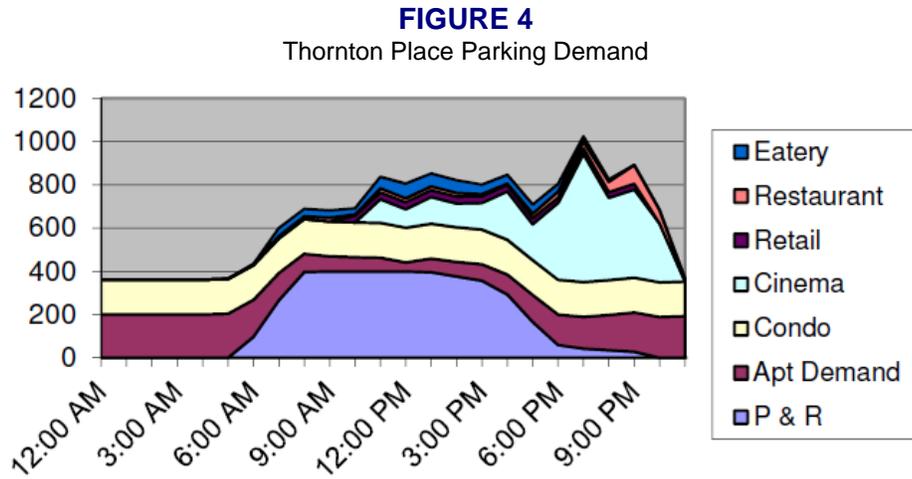
**FIGURE 3**  
Parking Sign



Reenvisioned as a transit-oriented community, recent public and private investments in Northgate include a transit center with park-and-ride and a future light-rail station, a community center, parks, a public library and a renovated Northgate Mall. This urban village is bordered by three miles of walking trails along the newly renovated Thornton Creek water channel — a restored ecosystem where salmon swim, birds sing and residents stroll. Thornton Place harmoniously links shopping and entertainment with residential living; it is a walkable, connected community with easy access to Northgate’s Transit Center. Thornton Place integrates the principles of smart growth, urbanism and green building from the ground up. In fact, Thornton Place has earned a LEED-Neighborhood designation for the entire project, which emphasizes the creation of compact, walkable, vibrant, mixed-use neighborhoods with good connections to nearby communities. The buildings at Thornton Place are also LEED Silver in recognition of their innovative design and healthy indoor environmental quality.

The county paid the developer a lump sum of \$5.25 million for a 40-year lease for 350 stalls in the 1,100-stall garage. The county also pays \$52,500 per year for maintenance with annual increases for inflation. Similar to the Simon transaction, the county has exclusive rights to park-and-ride stalls between 6 a.m. and 10 a.m. (**Figure 3**).

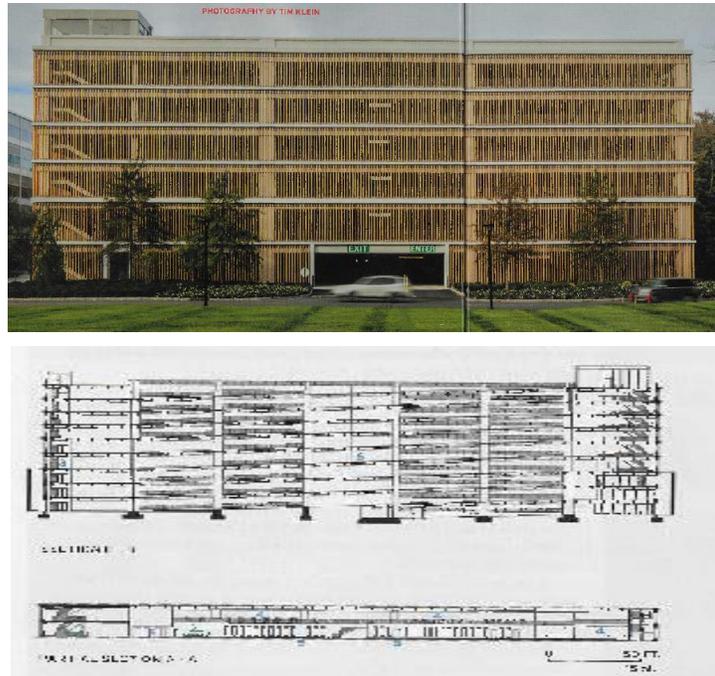
Prior to completing the transactions at Northgate, the county and the developer estimated the hourly parking demand. **Figure 4** provides the estimated hourly demand and indicates that sufficient parking would be available for all users during the day.



To date, there have been few issues with the shared parking in either location. Some park-and-ride customers have complained about the unavailability of parking spaces, but spaces are limited. Poaching does occur but hasn't yet risen to levels requiring management.

## Appendix C: Parking structures

**FIGURE 4**  
Parking and Recreation



347 Parking Garage, East Hanover, New Jersey  
Vittorio Lampugnani, architect (Source: Architectural Record)

**FIGURE 5**  
Sustainable Parking



Solar Panels at Glendale Community College (Glendale, California)

**FIGURE 6**  
TOD Parking Structure



1st Santa Fe, Los Angeles. Michael Maltzan, architect.

**FIGURE 7**  
Parking Garage and Retail



Facade treatment at CBD Chicago.

## References

### Urban Land Institute

*The Dimensions of Parking*, 5th Ed., National Parking Association, Martin Stein, published by Urban Land Institute, 2010. A best-practices document for parking development and operations. The document includes basic information on how to plan, design, finance, build and operate a parking facility. Topics covered include financing, parking at commuter and subway rail stations and compliance with the ADA.

*Shared Parking*, 2nd Ed., Mary S. Smith, published by Urban Land Institute, 2005. This publication can be used as a guide to estimate parking requirements for a mixed-use center, based on the type of tenants it will attract. The potential audience includes planners, developers and architects. Also included are case studies describing implementation of shared parking.

### American Planning Association

*The High Cost of Free Parking*, Donald C. Shoup, published by APA Planners Press, 2005. Donald Shoup argues that free, off-street parking has contributed to auto dependence, sprawl, energy use and other problems that have led to the degradation of American cities. Shoup proposes new ways for cities to regulate parking, including charging fair-market prices, using the resulting revenue to pay for services in the local neighborhoods, and removing zoning requirements for off-street parking. The author makes the case that these measures will make parking easier and driving less necessary.

*Parking Management Best Practices*, Todd Litman, published by APA Planners Press, 2006. This paper describes problems with current parking planning practices, the savings and benefits that can result from improved management, specific parking management strategies and how they can be implemented, and how to develop the optimal parking management program in a particular situation. Cost-effective parking management programs can usually reduce parking requirements by 20 to 40 percent compared with conventional planning requirements. Its benefits include support for TOD; reduced stormwater management costs, water pollution and heat island effects; improved travel options for non-drivers; lower housing costs; and more livable communities.

“Parking Solutions, PAS Essential Info Packet,” EIP-24, published by APA Planning Advisory Service, 2009. This PAS Essential Info Packet provides tools, strategies and alternatives to traditional minimum parking requirements. Included within are articles and reports on the background, importance and range of parking strategies available to planners. Staff reports and sample ordinances address shared parking, parking in lieu of fees, parking requirement exceptions and reductions, special parking requirements for downtown districts, “green” parking design, permeable pavement and bicycle parking.

*Planning and Urban Design Standards*, John Wiley and Sons, published by APA Planners Press, 2006. *Planning and Urban Design Standards* is a comprehensive planner’s quick reference guidebook covering almost all topics related to planning and development, including parking. The guidebook provides information on transportation and parking-related topics such as parking ratios, shared parking, parking design and circulation, transit planning and multimodal transportation facilities. The book includes extensive illustrations, concise explanations and focuses on practical applications.

### Institute of Transportation Engineers

*Parking Generation*, 4th Ed., Ransford McCourt, published by Institute of Transportation engineers, 2010. *Parking Generation* is a document prepared by the Institute of Transportation Engineers that summarizes a collection of parking demand data observations by land use type. *Parking Generation* provides statistics on the average peak parking demand, when the peak demand occurs, range, and coefficient of variation and standard deviation data. The document does not make any recommendations for minimum parking and simply represents the single largest set of empirical data of actual parking demand observations.

*Transportation and Land Development*, 2nd Ed., Frank Koepke, Vergil Stover, published by Institute of Transportation Engineers, 2002. This is a basic reference for practicing transportation and planning professionals. It is especially valuable to engineers and urban planners responsible for the development and administration of local land development codes, planners and architects who prepare site

development plans, and others involved in land development. It provides information on such topics as site planning, functional circulation systems, intersection design, driveway location and design, parking lot layout, and on-site circulation. The incorporation of pedestrians and bicyclists in a safe and efficient circulation system is addressed. Photographs and graphs are used extensively to illustrate access, site circulation and development practices.

### Additional resources

- “U.S. Parking Policies: An Overview of Management Strategies”; by Rachel Weinberger, John Kaehny and Matthew Rufo; Institute for Transportation and Development Policy; February 2010. This report identifies core sustainable parking principles and illustrates how smarter parking management can benefit consumers and businesses in time and money savings, while also leading to more livable, attractive communities. This report focuses on lessons learned from local governments around the country that have started to challenge and change parking requirements, earning both economic and political rewards. These newer approaches emphasize measures that manage parking demand through pricing, shared parking and reduced off-street requirements. These demand management oriented policies are often found in central business districts served by public transit.
- “Transit Agency Parking Pricing and Management Practices Peer Review,” Nelson/Nygaard 2010 for DRCOG. The purpose of this report was to provide case studies of transit agency park-and-ride management policies and practices at peer agencies of the Denver Regional Transportation District; however, the information provided can be utilized by other transit agencies to inform parking policy decisions. The report summarizes several transit agencies’ efforts to implement best practices, policies and programs to better manage station parking and promote TOD.
- Parking Costs, Chapter 5 of *Transportation Cost and Benefit Analysis II*, Victoria Transport Policy Institute, August 2011. The Parking Costs chapter of the larger *Transportation Cost and Benefit Analysis II* explores the costs of providing parking facilities. It estimates the costs of different types of parking spaces, the number of parking spaces per vehicle and distribution of parking costs.
- TCRP Report 128: “Effects of TOD on Housing, Parking and Travel,” G.B. Arrington and Robert Cervero, Transit Research Board, Washington, DC 2008. The report explores the demographics of TOD residents and employers, and their motives for locating in TODs. The report also examines the travel characteristics of residents before and after moving to a TOD and ways to increase transit ridership among these residents. In addition, the report reviews the potential effect of land-use and design features on travel patterns, transit ridership and the decision to locate in a TOD.
- “Transit Friendly Parking Structure Guidelines: Planning, Design, Stewardship,” Darius T. Sollohub, AI, FHWA-NJ-2007-002, June 2007. Transit facilities, which often include parking, are challenged by many parking-related issues. The report identifies best practices for developing structured parking in downtowns that focus on transit. The document presents the current state of the practice, offers conceptual designs and feasibility of case study facilities (all New Jersey locations), and presents design guidelines and management standards. These guidelines and standards are organized according to three interrelated subject areas: planning, design and stewardship.
- “Replacement Parking for Joint Development: An Access Policy Methodology,” Richard Willson, Ph.D. AICP, BART Department of Planning and Real Estate, April 2005. This report suggests a method for developing access and replacement parking strategies for the San Francisco Bay Area Rapid Transit (BART) District’s Joint Development Program. It summarizes the context for this issue, identifies problems associated with current replacement parking practice, outlines general principles for access/replacement parking, and recommends an access/replacement parking methodology. It suggests that scenarios involving less than full replacement parking, alternative access improvements and parking charges will produce the most positive overall outcomes for BART.

## Abbreviations and acronyms

<b>ADA</b>	Americans with Disabilities Act
<b>AICP</b>	American Institute of Certified Planners
<b>APTA</b>	American Public Transportation Association
<b>BART</b>	Bay Area Rapid Transit
<b>CBD</b>	central business district
<b>DRCOG</b>	Denver Regional Council of Governments
<b>EJ</b>	environmental justice
<b>FHWA</b>	Federal Highway Administration
<b>FTA</b>	Federal Transit Administration
<b>HOV</b>	high-occupancy vehicle
<b>JPA</b>	joint powers agreement
<b>LEED</b>	Leadership in Energy and Environmental Design
<b>MPO</b>	metropolitan planning organization
<b>TCRP</b>	Transit Cooperative Research Program
<b>TDM</b>	transportation demand management
<b>TOD</b>	transit-oriented development
<b>VMT</b>	vehicle miles traveled

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