Parking Supply Management Strategies

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1.0 Introduction

Several parking supply management strategies are outlined in this report. The strategies specifically target methods to maximize the efficient use of existing parking facilities and off-street spaces. The strategies discussed include:

- Reduced minimum requirements
- Maximum parking requirements
- Caps on the overall supply of parking
- Preferential parking for car and vanpool patrons
- Peripheral parking with shuttles
- Shared parking
- Improved user information
- Transportation Management Associations

Section 2 and Section 3 provide some context for the discussion of parking supply strategies by identifying the various types of parking and the impacts of parking supply on land use.

2.0 Parking Types

There are several different types of parking which serve different functions and have varying turnover frequencies. The strategies which will be looked at here primarily address off-street parking facilities but indirectly impact on-street parking as well.

On-street parking on commercial streets: Typically considered to be the most convenient parking, these spaces should be managed for maximum turnover to serve short-term parking for shopping and other errand trips. This can be done by implementing time limits, such as two hours or less, and applying short-term pricing.

On-street parking on non-commercial streets: Typically used by residents, parking in these locations becomes an issue when "spillover" parking by all-day parkers working at nearby employment centres or shoppers use these streets for parking.

Off-street public parking facilities: These are less convenient parking spaces and so should be managed for parking longer than four hours and up to a day, including parking by employees, long-term visitors and residents.

Off-street private parking facilities: These are often the most convenient parking spaces for a particular site or destination, but may also be convenient for other nearby users. They tend to serve other nearby facilities with different peaks.

Disabled Parking: Primarily regulated through the Building Code, the number of disabled parking spaces must be provided is based on the total number of parking stalls required under land use bylaw regulations. The Building Code also regulates the size of spaces and location.

Bicycle Parking: The same consideration made for vehicular parking should also be given to bicycle parking. Bike parking should be convenient to all destinations within a major activity area and secure. Downtown areas should generally have bike racks within view of building entrances. Indirectly adequate bike parking can reduce the need for motor vehicle parking by encouraging and making cycling more convenient.

3.0 Impacts of Parking Supply

Parking supply can impact transportation choice and land use in many ways. Some of these are outlined below.

Central Business Districts: CBD's are unique for having high densities, along with large numbers of employment, social and cultural activities. As a result, CBD's attract large numbers of people to a concentrated area. Depending upon the transportation mode, this can result in high demand for parking or transit services. Demand for parking poses an interesting paradigm.

> "Abundant inexpensive parking would make the CBD more attractive if it had no other consequences; however, plentiful, low cost parking may be at odds with the very aspect that makes a downtown area unique - high density." (Voith, p. 4)

Transportation Choice: Many studies have shown that both parking availability and price are the most important determinants for travellers in choosing a transportation mode. Where parking is free and readily available, people are more likely to drive. Where parking is expensive and transit service provides a good alternative, people are more likely to use transit.

Cost of development: A single parking space requires 350 square feet of land when you account for the space and circulation area. In CBDs where real estate values are high, the cost of a single parking space on a surface lot can range from $25,000 to $50,000, depending on location and land values. High parking costs can prohibitively restrict the provision of affordable housing for residential or mixed-use developments and even the overall financial viability of a development.

Managing parking supply works best when done in conjunction with other commuting and transportation demand management programs. Specifically, policies that limit parking supply within a given area work best when:

- Current parking is well utilized;
- Transit, bicycle, pedestrian and ridesharing facilities and programs exist to provide travellers with transportation options, and
- There is no parking capacity in surrounding neighbourhoods or on vacant land to absorb "spillover" parking.

4.0 Strategies

Reduced Minimum Parking Requirements

Nature of Strategy

Definition: Reduces the amount of parking developers are required to provide as specified in land use bylaws.

How It Works*:* Municipalities control parking supplies through land use bylaw regulations. Bylaws typically establish the minimum amount of parking developers must provide as determined by the zoning and/or the land use of the property. Municipalities can allow reductions in minimum requirements in return for developer agreements to support transit, carpooling, cycling or for payment into a municipal parking or

traffic mitigation fund (cash in-lieu programs).

Applicable Contexts

- Parking requirements result in a greater supply of parking than is utilized due to local travel market conditions, or due to unique aspects of the land use and/or surrounding land uses.
- Mixed uses are present or planned where parking supplies can be shared. Municipalities can negotiate for parking supplies serving several compatible uses instead of separate and more extensive supplies serving each use.
- Commercial and public parking is well utilized, limiting opportunities for parkers to shift parking locations as supplies are tightened.
- The cost of providing parking is high compared to travel demand measures.
- Transit service is frequent and capacity is not saturated, offering a good alternative for drivers.
- Lower density, suburban areas where supplies well exceed demand. These lower density, suburban areas may be sites for new mixed use developments where parking can be shared across uses.
- Land values and parking facility costs are high, encouraging developers to seek reduced parking in return for traffic mitigation strategies or cash in-lieu.
- Land uses around transit stations where transit use reduces parking demand.

Keys to Effectiveness

- Reduced parking supplies encourage less auto use and parking if convenient and affordable travel alternatives are available. If the minimum is too low relative to actual parking demand, "spillover" parking might result. For example, all day parking may occur neighbourhoods, retail areas or short-term on-street spaces.
- Supplemental strategies to parking minimums such as preferential parking for residents, and enforcement against meter feeding are essential.
- Alternatives to reducing parking must be attractive to developers and lenders.

Implementation

Policy Instruments: Land use bylaws can specify terms and conditions for reductions. The bylaw might specify the proportion or percent of spaces which can be reduced for programs such as designated carpool stalls, transit pass sales or on-site carpool matching services. Where conditions are more complex or for large developments, a developer agreement can be used to specify developer obligations. Land covenants may be used to insure agreed upon programs continue beyond a change in property ownership.

Administration, Operations, Monitoring: Municipalities must monitor new developments to insure implementation and ongoing provision of agreed upon programs (carpool, transit encouragements) and/or facility improvements (information displays, carpool stalls, bus turn outs, bike racks).

If the development agreement involves payment of an in-lieu fee, compliance monitoring only requires payment verification. However, in-lieu fee programs present special administrative issues. Fee collection and expenditures on promised transportation or parking programs must be credible and prompt to encourage developer contributions. In Calgary, developers objected to the program because promised municipal parking structures peripheral to downtown were slow to develop. Therefore, the use of in-lieu funds must be immediate and visible to the public in order to be credible and encourage continued participation.

Extent of Current Use

Overall: Used in a several localities active in trip reduction programs and with high capacity transit

service.

Example:
San Francisco eliminated minimum parking requirements completely for development projects within a half mile of rail stations and 1/4 mile within major transit streets.

Parking Maximums

Nature of Strategy

Definition: Limit the amount of parking developers may provide as specified in land use bylaws.

How It Works: Municipalities control parking supplies through land use bylaws. Bylaws typically establish the minimum amount of parking developers must provide. Municipalities can establish maximum provided parking to prevent and oversupply. Such maximums may be established in addition to minimum requirements or as stand alone parking regulations.

Applicable Contexts

Most applicable contexts for implementing parking maximums are similar to those for reduced minimums:

- Developer preferences or minimum parking regulations result in more parking than is utilized. minimums might be lowered and new maximums developed if bylaw requirements are the cause of over supply.
- Mixed uses are available or planned where parking supplies can be shared. Municipalities can develop maximums for parking supplies serving several compatible uses instead of separate and more extensive supplies serving each use.
- Commercial and public parking is well utilized, limiting opportunities for parkers to simply shift parking locations as supplies are tightened.
- Transit capacity is frequent and not saturated, offering a good alternative for drivers.
- Lower density, suburban areas where supplies to exceed demand. These areas also may be sites for new mixed use developments where parking can be shared across uses (Greyfields).
- Land use values and parking facility costs are high, encouraging developers to support maximums, or cash in-lieu.
- Land uses in proximity to transit stations where transit use may reduce parking demand, especially in suburban and lower density situations where evidence suggests parking supplies often are overly ample.

Keys to Effectiveness

- Maximums should be based on solid research regarding parking demand and implemented with the involvement of key stakeholders.
- Reduced supply encourages less auto use and parking.
- If the maximum is too low relative to actual parking demand, "spillover" parking might result, such as all day parking in neighbourhoods, retail areas or short-term parking on-street at meters.
- Supplemental strategies such as preferential parking for residents, enforcement against meter feeding and parking over limits in timed zones are essential.
- Maximums are not tolerant of underestimated parking demand. If maximums are too low, developers

cannot provide more parking.

Implementation

Policy Instruments: Land use bylaws specify maximum terms and conditions for reductions such as range of spaces depending on the zoning. The conditions might be established based upon the extent and frequency of transit service, type of land use, anticipated employee densities, and variations in carpool, walk and cycling modal share rates.

For complex projects, a development agreement might specify allowed parking at development phases with the aim of achieving no more than the maximum in the final phase.

Administration, Operations, Monitoring: Monitoring through development is required to insure no more than the maximum is provided. Where the maximum is coupled with special agreements or bylaws requiring developer and/or employer trip reduction programs, monitoring must insure the programs (carpool and transit encouragements) or facility improvements (information displays, carpool stalls, bus turn outs, bike racks) are provided.

Maximum standards can be phased in over time as demand reduction programs and facility improvements are provided.

Extent of Current Use

Overall: Many cities and regions have begun using parking maximums.

Examples:

- Seattle: Currently parking maximums are implemented in the downtown core, but application to light rail transit stations in conjunctions with the opening of light rail service is under consideration.

- Beaverton, Oregon: Regulates land devoted to parking instead of the number of spaces. Developers can choose to build parking structures within the allowable footprint or forgo additional parking for a site.

- San Francisco: Permits only seven percent (7%) of a buildings gross floor space for parking. New development is granted an occupancy permit only after a parking plan has been prepared by the developer.

Areawide Parking Caps

Nature of Strategy

Definition: Limits the total supply of parking in a designated area.

How It Works: A municipality can limit overall parking supply in a designated area through a comprehensive set of policies targeted at an overall cap. These policies can be outlined in a parking management plan and may include both supply and demand related policies. Maximum parking ratios, prohibition of free standing garages or for surface lots, provision of new buildings without parking, and pricing policies for public facilities.

Applicable Contexts

- Developer preferences or minimum parking regulations result in more parking than is utilized. Areawide caps are one way to reduce over supply.
- Commercial and public parking is well utilized, limiting opportunities for parkers to shift parking locations as supplies are tightened.
- Transit capacity is frequent and not saturated, offering a good alternative for drivers.
- Lower density, suburban areas where supplies exceed demand. These areas may be sites for new mixed use developments where parking can be shared across uses.
- Land use values and parking facility costs are high. New programs to reduce or eliminate parking requirements in return for cash in-lieu. New transit service may also provide opportunities for implementation of parking caps.

Keys to Effectiveness

The supply of parking in an area is a key determinant in travel mode. Generally, the tighter the parking supply, the more likely drivers will consider using alternative modes. The relevant "supply" includes all available parking to commuters, both on and off-site within walking distance.

- Reduced supply encourages less auto use and parking. If the supply is too low relative to actual parking demand, "spillover" parking might result, such as all day parking in neighbourhoods, retail areas or short-term on-street at meters and timed zones.
- Supplemental strategies to an areawide cap such as preferential parking for residents, parking enforcement, and increased transit service.
- Requires ongoing and comprehensive management and evaluation.

Implementation

Policy Instruments: A downtown parking plan is the usual implementation method for areawide caps. It may contain formal or informal limits, bylaw regulations such as maximums and minimums, requirements for site specific parking plans, prohibitions on free standing garages and parking rate schedules for existing municipal parking. Supplementing these policies, especially for complex and large new developments, might be developer agreements specifying particular parking conditions.

Administration, Operations, Monitoring: Implementing a comprehensive cap policy may require considerable administrative effort. Periodic parking surveys, studies, plan and policy updates may be needed to make ongoing decisions about the overall level of the cap, how to allocate the allowed inventory by zone, what exemptions to allow and how the cap should vary over time.

The administrative, planning and decision making requirements are more complex and demanding than those associated with implementing maximum or minimum parking code policies. Additionally, commercial and development interests are certain to exert periodic pressures to increase the supply or broaden exemption, as has taken place in Boston and Portland.

Extent of Current Use

Overall: Very little use

Examples: Experience with parking cap policies has been limited and mixed with other transportation policies making it difficult to determine the effectiveness with any level of confidence.

- Portland, OR: In 1975, the city set an overall cap of approximately 40,000 parking spaces downtown,

including existing space, approved but not built spaces, and a remainder termed "reserve" from which space for new development is allocated. The cap moved up to about 44,000 spaces by the late 1980's, and has moved up again recently to 46,000 along with the implementation of other strategies to reduce vehicular traffic such as transit improvements, new employer work hour programs, and carpool and transit promotions. Since the early 1970s, transit use has gone from a 20 percent modal share to 50 percent in the 1990s. (FTA, 1994)

- Boston, MA: In 1977, the City of Boston adopted a freeze on commercial parking open to the public, but not on parking reserved for individuals or company use within office buildings. By the late 1980s the number of these exempt spaces had increased by over 25 percent and the overall cap had no effect on reducing traffic along major corridors to the city. (FTA, 1994.)

Preferential Parking

Nature of Strategy

Definition: Desirable parking spaces are set aside for car and van pools.

How It Works: Provides an incentive for a desired mode (i.e., car and van pools) by allowing closer access to destinations, as well as covered and/or secured parking spaces.

Applicable Contexts

- Off-street public or private parking facilities, but can also be applied on-street.
- Lower density areas where transit options are minimal.
- Where parking demand meets or *exceeds* supply to provide incentive.
- Large parking areas where available spaces are a significant distance from building entrances.

Keys to Effectiveness

- Effectiveness will depend on the relative attractiveness of preferential parking (i.e., shortage of easily accessible and convenient all day parking.)
- Large, well utilized parking lots with stalls close to entrances will provide a shorter walk and possibly a sense of enhanced security.
- Covered, well lit parking might be designated as preferred, compared with surface and outlying parking areas.
- Effectiveness may be limited where transit use is substantial.
- Promotion

Implementation

Policy Instruments:
- Public parking authorities can implement through administrative action.
- Developers can be required to implement through trip reduction ordinances and/or developer agreements.
- Employers can work with building managers to designate preferential stalls, informally or secured as part of a space lease.

Administration, Operations, Monitoring:

- Parking operators, building management and/or employers set rules of use and monitor use. Rules can address: whether rideshare patrons must arrive together to be eligible for stalls or if drop off is allowed, or whether vehicles must be registered and display permits.
- Monitoring determines if ineligibles are poaching stalls and whether eligible rideshare patrons are continuing to pool.
- If parking collection or attendant personnel already are present, the added effort of monitoring carpoolers will be small. However, where there are no such personnel, a transportation or parking coordinator must be designated.
- Monitoring of on-street carpool stalls is difficult because there is no checkpoint to monitor arrivals as with off-street facilities.
- Localities requiring or agreeing to preferential parking at new developments must monitor to insure preferential parking is provided.

Extent of Current Use

Overall: Designated spaces for rideshare patrons are fairly common in cities which are actively managing parking supply and implementing TDM programs.

Peripheral Parking with Shuttles

Nature of Strategy

Definition: Parking on the periphery of downtown or activity centres served by shuttles or transit.

How It Works: Municipalities establish peripheral parking outside the main core area of an activity centre. Parking may be owned or leased by the municipality, or secured by developers. Shuttle service may be developer or employer operated, or operated by a transit district. Parking may be open to all or designated for car and vanpools.

Strategies to accomplish this include:
- Information (signs, maps and brochures) on remote parking availability.
- Regulations and pricing that encourages long-term parkers to use peripheral facilities
- Shuttle services, free transit zones and pedestrian facilities to improve access to peripheral parking facilities.

Applicable Contexts

Best prospects for successful implementation are in the following contexts:
- Commercial, lease and public parking is well utilized, whereas peripheral parking is readily available, secure and free or low cost.
- The costs of providing parking on site are high (e.g. in structures or underground) compared to securing outlying parking. In such settings, developers and lenders may be more willing to consider peripheral parking.
- Transit capacity or shuttle service to and from lots is frequent and not saturated.
- "Overspill" parking supplies on street and in neighbourhoods are at a minimum, or are regulated through permits, and/or enforcement is planned.
- Land values and parking facility costs are high, encouraging developers to seek reduced parking in return for traffic mitigation strategies.

Keys to Effectiveness

- If the intended result of peripheral parking is less traffic on congested streets and reductions in vehicle emissions associated with stop and go driving, the effectiveness will depend on where congestion is located. If congestion and travel delays occur on highways leading into an activity centre and not within the centre, then peripheral parking will have minimal impact on reducing congestion and emissions.

- Peripheral lots may attract solo drivers, carpoolers or transit users depending on their location, price, security and frequency of shuttle service.
- Parking and/or circulation within the activity centre area is restricted (i.e., University campuses.)

Implementation

Policy Instruments: Depending on the scale of the program, an adopted master plan and special bylaws may be required. If tied to reductions in parking requirements, parking code revisions may be required. Developer agreements, lot leases and possibly transit district or shuttle provider contracts are other possible policy instruments depending on the type of program.

Administration, Operations, Monitoring: Considerable planning is needed to determine best locations for intercepting trips. The location also should have minimal adverse impact on adjacent properties. For lots owned by the jurisdiction, maintenance and security are important considerations. For lots leased, leases must be negotiated including hours of operation, security and maintenance standards, liability, term, and termination notice. For any program to succeed, an ongoing marketing effort is needed, probably in cooperation with activity centre employers and merchant associations to maintain visibility of the lots.

Funding is another key operational issue. Where in-lieu fees are the supporting mechanism, fee collection and expenditures on promised programs must be credible and prompt to encourage developer contributions. In Calgary, developers objected to the program because promised municipal parking structures peripheral to downtown were slow to develop.(*Urban Transportation Monitor*, 1990) Monitoring of lot usage, prior mode of users and shuttle ridership are important to measure the success levels.

Extent of Current Use

Overall: Modest usage in cities with mixed results due to a combination of factors including: lack of sufficient, long-term funding, lack of visibility, "spillover" parking availability in surrounding neighbourhoods, perceived as well as real inconvenience of parking location.

Examples:

- Universities: Many universities, including Georgia Tech, M.I.T., UCLA and the University of Maryland, operate successful shuttle programs serving remote parking on and off-campus, residential areas, and the public transit system stations. Student registration fees, parking fees, and parking ticket revenues, typically fund the services.

- Recreational Shuttles: Several California coastal cities operate beach shuttles from remote parking facilities. Enforcement of existing metered parking in close proximity to beaches and preferential parking for residents along the beach help make the shuttle programs successful. Funding usually comes from a combination of hotel taxes, general funds, fares, and parking revenues.

Shared Parking

Nature of Strategy

Definition: Parking spaces are shared by more than one user, allowing spaces to be used more efficiently.

How It Works:
Municipalities can implement shared parking through policy or bylaw regulations. Sharing arrangements are made between individual developers and property managers. Shared parking can be implemented using brokerage services to match potential sharing partners, which can be provided by a Transportation Management Association or municipality.

Applicable Contexts

- Land values and parking facility costs are high.
- Mixed uses are present or planned.
- Transit reduces parking demand for land uses around transit stations or along transit routes.
- Parking facilities are underutilised.

Shared parking spaces increase the number of users by 20-40%. Greater reductions are possible with mixed land uses, where different activities have different peak demand times.

Keys to Effectiveness

- If there is an under supply of parking or if shared parking users are not properly "matched", spillover problems might result.
- Supplemental strategies such as preferential parking for residents, enforcement and improved user information are essential.
- May require considerable administrative effort to match complementary users.
- Inadequate capacity during unusual peak demand periods may occur on occasion.

Implementation

Policy Instruments: Depending on the scale of the program, special bylaws and/or development agreements may be required. Cash in-lieu fees allow developers to pay into a fund for off-site municipal parking facilities instead of providing their own on-site parking

Administration, Operations, Monitoring:
- Establish standard procedures for implementing shared parking which specify how to calculate minimum parking requirements for different combinations of land uses, acceptable walking distances, requirements for sharing agreements, verification and enforcement.
- Establish public off-street and on-street parking maximum as a substitute for private off-street parking .
- Transportation Management Associations or local planning agencies can be used to provide shared parking matching and brokerage services.
- Good pedestrian access and appropriate signage for users concerning shared parking is essential.
- Regular parking studies and feedback from users to identify problems with shared parking should be conducted.
- Potential spillover problems should be anticipated and responded to with appropriate regulations and

enforcement programs.

Extent of Current Use

Overall: Modest usage.

Examples:

- Tri-Met transit authority in Portland, Oregon, encourages shared parking near transit stations as an efficient and cost effective way to provide parking while minimizing the amount of land devoted to parking facilities. Park & Ride lots are shared with apartment complexes, a regional justice centre, churches and movie theatres.

Improved User Information

Nature of Strategy

Definition: Provide convenient and accurate information on parking availability and location.

How It Works: Parking is made more accessible to the public by allowing travellers to make more informed decisions regarding their trip with improved user information. Using maps, signs, brochures and electronic communication, travellers can obtain information regarding the location, availability, type and cost of parking prior to making their trip or during their trip.

Applicable Contexts

- Parking is underutilised in some locations and over-utilized in other locations.
- Parking demand is peak oriented.
- Short-term parkers are "competing" with long-term parkers and are unaware of the location and availability of high-turnover spaces.
- There is a "perceived" parking problem and not an actual problem.

Keys to Effectiveness

- The supply of parking is a key determinant in travel mode. If travellers are informed about the location, availability and price of parking, they can make better decisions about their travel mode and route.
- The affect of this strategy is limited so it should be implemented with other supplemental strategies.

Implementation

Policy Instruments: Municipalities, public parking authorities, and transportation management associations (see below) can establish wayfinding programs, set uniform sign standards and produce and disseminate maps, brochures and website information.

Administration, Operations, Monitoring:
Funding for signs, brochures, and website information can come from several sources including: Chambers of commerce and other business groups, transportation management associations, and municipalities.

Extent of Current Use

Overall: Broad context and use.

Transportation Management Associations

Nature of Strategy

Definition: Private, non-profit organizations that provide transportation services for a particular area (ie., CBDs, business parks).

How It Works: TMAs provide an organizational structure to implement various TDM strategies and manage parking supply within a particular area.

Developers or facility managers may be required to establish a TMA to mitigate local congestion and parking problems. TMAs are typically funded through dues paid by member businesses and municipal funding.

Applicable Contexts

TMAs can be implemented any where there are multiple employers or businesses clustered together, which can benefit from cooperative transportation management, parking brokerage services, shared parking coordination, and/or shuttle services to peripheral parking lots. TMAs can also conduct advocacy work by promoting transit use, carpooling and vanpooling services, compressed work weeks, bike use, preferential parking, and advocating certain transportation improvements such as installing short-term parking meters in certain locations.

Keys to Effectiveness

TMAs should support a variety of transportation services, travel options and incentives, including planning efforts to create more pedestrian- and transit-friendly land use, and parking brokerage services to help businesses share and trade their parking resources.

TMAs should implement programs that provide both positive and negative incentives. TDM programs tend to be most effective when they improve consumer travel choices and provide incentives to use alternatives to driving.

TMAs can pay for themselves by averting the need for high cost parking facilities through more efficient management and use of existing facilities and services and through the implementation of more cost effective demand management programs.

Implementation

Policy Instruments: Regional and local governments, business associations and individual businesses can all help establish TMAs and provide seed funding.

TMAs are created through regional or provincial policies which allow for their formation, organization and scope of responsibility.

Administration, Operations, Monitoring: TMA's can be guided by a steering committee with members from other non-profit organizations, businesses and municipal government.

Extent of Current Use

Overall: Broad use in many regions.

Examples:

- Ride-On in San Luis Obispo County, California is a non-profit transportation cooperative. It owns 35 vans and buses and provides:
  - Shuttle bus services to regional transportation terminals.
  - Shuttle services for children and patients.
  - Special event transportation
  - Lunchtime shuttle
  - Employee Transportation Coordinator (ETC) contract services
  - Transportation information and referral
  - Commuter baseline survey
  - Guaranteed/Emergency Ride Home

- Commuter Challenge in King County, Washington provides expertise and support to create to businesses to create innovative solutions that reduce commute trip. The organization partners with an Economic Development Council and various city and state agencies. Some of the services it provides include:
  - An annual employer recognition program for employers who show management commitment to reducing employee commute trips.
  - Promotion and implementation of work options. Employers with real estate space needs, employee recruitment and retention challenges, and parking problems are encouraged to utilize work options for employees. A cost/benefit analysis tool and a *Manager's Guide to Compressed Workweeks and Flextime* are available for employers considering implementation or increasing work options.
  - Transportation workshops, forums, and committees to address the congestion issues.
  - Bi-monthly newsletter containing articles on transportation policy and helpful information on what other businesses are doing to reduce commute trips
  - A website that provides extensive resources to support commute trip reduction programs, and descriptions of successful case studies.

- The Lloyd District Transportation Management Association in Portland, Oregon is a joint initiative involving the City of Portland, the regional transit authority, Tri-Met, and businesses in downtown Portland. The TMA promotes transit, carpooling/vanpooling, bicycling, telecommuting, and compressed work weeks, guaranteed rides home, reserved parking spaces for carpool and vanpool vehicles at a reduced fee, and advocates for transportation improvements. Some of the successes of the TMA include:
  - Implementation of an unlimited use annual transit pass available for participating businesses at a substantial discount. Approximately 25% of the downtown workforce uses the pass which has resulted in 72% increase in transit trips.
  - Since 1997, there has been a 25% decrease in the number of employees driving alone, a 10% increase in carpools and vanpools, and 15% increase in telecommuting.
  - Installation of parking meters that encourage high turnover for merchants.
  - Program funding is now completely financed through fees from parking meters and commissions from selling transit passes.

Summary Table of Parking Supply Strategies

Strategy	Description	Application Context	Keys to Effectiveness	Extent of Use
Reduced minimum requirements	Reduces the number of parking spaces required for land uses as specified in land use bylaws.	• Good transportation alternatives exist. • Mixed land uses are available or planned. • Land use values and parking facility costs are high. • Potential oversupply of parking may result.	• Convenient and affordable travel options are available. • Minimums must not result in "spillover" parking on streets or surrounding neighbourhoods.	Used by many cities with reasonable success.
Parking Maximums	Limits the amount of parking that can be provided as specified in land use bylaws.	• Good transportation alternatives exist. • Mixed land uses are available or planned. • Land use values and parking facility costs are high. • Potential oversupply of parking may result.	• Maximums must be based on solid research since they are not tolerant of underestimated demand. • Convenient and affordable travel options must be available. • Maximums must not result in "spillover" parking on streets or surrounding neighbourhoods.	Used by many cities with reasonable success.
Areawide Parking Caps	Limits total supply of parking in a designated area through an areawide policy or set of policies.	• Good transportation alternatives exist. • Mixed land uses are available or planned. • Land use values and parking facility costs are high.	• Must not result in "spillover" parking on streets or surrounding neighbourhoods. • Supplemental strategies such as preferential parking for residents, enforcement and increased transit service are required. • Requires ongoing and comprehensive management and evaluation.	Very limited implementation with limited and mixed success. Portland, OR has been successful
Preferential Parking	Desirable parking spaces set aside for car pools and van pools.	• Lower density areas where transit options are minimal. • Large parking areas where available spaces are a significant distance from bldg entrances	• Promotion • Incentives for preferred spaces are significant in relation to general purpose parking.	Commonly used in business and suburban office parks.

Strategy	Description	Application Context	Keys to Effectiveness	Extent of Use
Peripheral Parking with Shuttles	Parking on periphery of downtown or major activity centres served by shuttles or transit.	• Existing commercial, lease and public parking is well utilized. • Cost of providing on-site parking is high. • Land use values and parking facility costs are high.	• Parking and/or circulation within the activity centre area is restricted.	Modest usage in cities with mixed results due to a combination of factors: lack of sufficient, long-term funding for shuttles, lack of visibility, perceived and real inconvenience of parking.
Shared Parking	Parking spaces are shared by more than one user, allowing spaces to be used more efficiently.	• Land values and parking facility costs are high. • Mixed land uses are available or planned. • Transit reduces demand. • Existing parking facilities are underutilised.	• Must not result in "spillover" parking on streets or surrounding neighbourhoods. • Administrative effort required to match complementary users.	Modest usage. Commonly implemented around transit stations.
Improved User Information	Provide convenient and accurate information on parking availability, price and location.	• Parking is underutilised in some locations and overutilized in others. • Parking demand is peak oriented. • Short-term parkers are "competing" with long-term parkers. • Perceived and not an actual parking problem.	• Limited effect by itself, therefore it should be supplemented with other strategies.	Broad context and use.
Transportation Management Associations	Private, non-profit organizations that provide transportation services for a particular area.	• Multiple employers or businesses clustered together which can benefit from cooperative parking management.	• Implement programs with both positive and negative incentives. • Convenient and affordable travel options are provided.	

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