

Rethinking Surface Parking for Pedestrian Friendly Office Development





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The Canadian Urban Institute is a Toronto-based not for profit organization with a national and international reach. Through our work we seek to create a world of thriving, sustainable, harmonious and engaged urban regions.

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Table of Contents

INTRODUCTION	4
<i>The Challenge</i>	5
<i>The Actors</i>	7
<i>The Scale And Urban Context</i>	8
FIVE STRATEGY AREAS FOR PEDESTRIAN FRIENDLY DEVELOPMENT	9
<i>Reduce The Supply Of Parking</i>	12
<i>Better Parking Design</i>	15
<i>Reduce Parking Demand</i>	17
<i>Invest And Find Innovative Ways To Pay For High Density Parking Infrastructure</i>	19
<i>Manage Parking As A Long Term Asset</i>	22
SELECTING THE OPTIMAL STRATEGIES	24
<i>Individual Office Building</i>	25
<i>Office Park Or Cluster</i>	25
<i>Emerging Downtown</i>	26
<i>Established Downtown</i>	26
CASE STUDIES	27
<i>Tyson’s Corner, Virginia - Transforming A Business Park Into A Mixed-Use Downtown</i>	27
<i>Markham Centre – Moving From Surface To Structure</i>	30
<i>Downtown Vancouver – A New Breed Of Parking Challenges</i>	32
CONCLUSIONS	33
APPENDIX 1: THE ACTORS	36
APPENDIX 2: THE SCALE AND URBAN CONTEXT	37
APPENDIX 3: REFERENCE LIST	38
APPENDIX 4: IMAGES	42

Introduction

The automobile has an important role to play in the urban transportation system. As a result, parking is an essential piece of infrastructure in the built environment. Yet, cities are continually challenged to find ways of integrating parking into their fabric that are efficient, compact, attractive and ecologically sensitive. A key reason for this is that structured parking and/or underground parking is extremely expensive to construct and maintain and as a result large areas of surface parking prevail.

City builders are particularly challenged when it comes to creating higher density parking options in association with commercial developments. This is largely explained by land economics that do not typically support underground or structured parking – one of the prerequisites for locating office buildings sufficiently close together to create a critical mass of pedestrian activity capable of supporting retail and rapid transit. In response, city builders are starting to adopt more proactive approaches to tackling this challenge and are using parking as a strategic tool in city building. They are showing a willingness develop partnerships, create financing options and take on both the economic risks and rewards associated with building and managing their own parking facilities. However, these efforts are most prevalent in a downtown context and efforts remain slower and less coordinated in the suburban office parks.

Therefore, this research aims to not only outline best practice strategies to attract high density parking options that could facilitate office growth, but also provides an overview on how these strategies could be optimally applied in a range of urban contexts (established downtowns, emerging downtowns, office parks and individual developments). This research also aims to illustrate the role and influence individual stakeholders have in addressing this challenge (municipalities, private developers, tenants and employees). The strategies contained in this report are most powerful when combined, so case studies have also been included to provide insight on how these strategies can be effectively integrated and implemented on the ground.

Additionally, to gauge the level of interest in adopting these best practice parking strategies, the ‘development community’ was surveyed via a series of interviews. Given this challenge is largely present in a commercial context, for the purposes of this study, the development



Downtown Toronto's east end in the 1970s



Downtown Toronto's east end today

In the 1970's downtown Toronto had an over abundance of surface parking. This land over time has been reabsorbed and redeveloped into mixed use communities with commercial office development and underground parking.

community comprised a sample of commercial and mixed use developers, commercial real-estate brokers, transportation specialists and municipal staff. The feedback gained was invaluable for this report to be able to develop strategies align and reflect market realities.

Overall, challenges associated with achieving higher density parking are complex and cannot be viewed in isolation. Rather, these challenges are inextricably linked to broader city building aims; intensifying commercial developments and reducing urban sprawl, building strong downtowns and urban centres, enhancing the public realm, and providing the community with a range of mobility options. As a result, city builders will benefit from seeing this challenge holistically, working at various scales and with diverse stakeholders to adopt mutually reinforcing land use, transportation and parking strategies to strengthen urban regions into the future.

The Challenge

City builders active in suburban municipalities across North America are envisioning higher density, pedestrian oriented and mixed use urban centres, which replicate the conditions that make traditional downtowns attractive to residents, workers and visitors alike. Many cities have been successfully moving toward this vision, but this has been largely based on attracting civic, cultural and educational facilities, as well as high density residential development. City builders remain challenged when it comes to attracting high density office development to growing urban centres. A key reason for this is costs associated with providing parking.

High density parking is at least 15 times more expensive than surface parking. While residential developments are typically able to absorb these costs as condominiums can be sold in advance to generate capital, the economics do not support high density parking for commercial developments. When emerging downtowns and new urban centres do manage to attract investment in commercial office buildings, these buildings are typically built with surface parking. This not only limits the size of office building that can be built (an increase in gross floor area requires additional land dedicated to surface

Getting from this:



To this:



The Mississauga Downtown21 Master Plan is an ambitious vision of transforming the city's core into a pedestrian oriented environment by enhancing public transit and facilitating mixed-use development. The remediation of surface parking lots for a variety of uses will be championed by underground and/or structured parking.

parking) but can also limit the number of office buildings that can be developed within a designated centre. As well, office buildings with surface parking create an unattractive environment where the dominant visual impression is a parking lot rather than an attractive pedestrian ambiance.

Instead, office development is largely focused in suburban office parks. These single use office parks offer affordable land, room to grow, and excellent highway access. Yet accommodating vehicles in these suburban office parks by building surface parking lots leads to rapid absorption of finite greenfield sites, limits opportunity for intensification and restricts pedestrian access. This leads to a series of further challenges, as more office parks are filled with low intensity development forms, office and commercial space continues to sprawl and because virtually all business activities rely on access by car, levels of congestion worsen at the regional level.

Parking Type	Cost (\$) per space*	Average \$
Surface Parking Lot		
Developer Estimate ¹	~\$2,000	~\$2,000
Structured Parking		
City of Kitchener Parking Facility ²	~\$32,000	~\$31,000
Mississauga Erindale GO Station ³	~\$43,000	
St John's Health Science Complex (hospital) ⁴	~\$19,000	
Underground and Structured Parking		
City of St Catharines Parking Facility ⁵	~\$46,500	~\$34,000
City of Fredericton Parking Facility ⁶	~\$20,800	
Underground Parking		
City of Kitchener Parking Facility ⁷	~\$58,000	~\$60,000
City of Toronto Parking Facility ⁸	~\$83,000	
Toronto, underground parking space for new condominium ⁹	~\$40,000	

**High density parking is at least 15 times more expensive than surface parking. The costs associated with both structured or under ground parking vary significantly based on the design qualities and the materials used during construction, as well as geological conditions. For the purposes of this paper, the initial capital costs have been averaged for the number of parking spaces in the facility to determine the average cost of an above ground or underground parking facility.*

¹ Surveyed a private developer to determine an average cost. This cost assumes standard landscaping treatments and surfaces.

² Figure drawn from transportation expert at the City of Kitchener, based on estimates from RFP process

³ Kenaidan Website. 2011. Available: http://www.kenaidan.com/index.php?option=com_content&task=view&id=123&Itemid=247

⁴ Government of New Foundland Website. *The Economy 2011- Inventory of Major Capital Projects*. Available:

<http://www.economics.gov.nl.ca/E2011/InventoryOfMajorCapitalProjects.pdf>

⁵ Standard Staff. 2012. *Carlisle St. garage opening Monday*. Available: <http://www.stcatharinesstandard.ca/2012/01/06/carlisle-st-garage-opening-monday>

⁶ City of Fredericton Website. 2011. *New East End Parking Garage Opens to the Public*. Available:

www.fredericton.ca/en/transportation/NR2011Mar25EastEndParking.asp

⁷ Figure drawn from transportation expert at the City of Kitchener, based on estimates from tendering process

⁸ Waterfront Toronto Website. 2012. *York Quay Revitalization*. Available:

http://www.waterfronttoronto.ca/explore_projects2/central_waterfront/york_quay_revitalization

⁹ Moneyville Website. 2012. *This Toronto Parking Spot Costs 100,000 A Year*. Available: <http://www.moneyville.ca/article/1019589--this-toronto-parking-spot-costs-100-000-a-year>

Therefore implicit to a more sustainable vision for urban growth is the creation of high density parking options. Yet in the face of these economic challenges efforts will need to be supported by proactive municipal leadership, regulations and expanded mobility options that work to reduce parking demand. Efforts will also need to occur on a range of scales to both centralize employment opportunities in emerging downtowns, but also enhance and strengthen suburban office parks so they can remain resilient and continue to attract growth into the future.

The Actors

The evolution of cities is immeasurably influenced by complex interactions between various actors. Many small actions taken by individuals or organizations can add up to major impacts in terms of the way cities are look, feel and function. For the purposes of this paper, the role that **municipality, developers, tenants** and **employees** play is examined to determine how each player can work to overcome some of the barriers associated with reducing areas of surface parking and creating pedestrian oriented commercial environments.

A detailed description of each of these four actors, what drives them and the benefits and challenges of moving towards pedestrian oriented development, is contained in Appendix 1.

The Scale and Urban Context

Cities are comprised of diverse neighbourhoods and development patterns. This research is concerned with four urban scales, the individual office building or cluster, the suburban office park, emerging downtowns and established downtowns. These urban contexts are described below and will respond to a different combination of best practise strategies as they evolve.

A description of each of these four scales and contexts is contained in Appendix 2.

Urban Context	Characteristics	Image
 <p>Individual Office Building/Cluster</p>	<p>These high density buildings are primarily accessible by automobile and have a large portion of their labour force commuting by car. This compounds the need for providing significant amounts of free car parking. Lower land prices make it more economical to provide this as surface parking rather than structured or underground parking.</p>	 <p>Individual Buildings or Cluster – High intensity building but only occupies a relatively small portion of the entire site.</p>
 <p>Suburban Office Park</p>	<p>Suburban office parks are generally characterized by wide roads, excellent access to highway/s, minimal transit options, single land uses (no residential development or other amenities) and increasing congestion issues. Edge Cities are characterized by having no determined or easily identifiable centre.</p>	 <p>Suburban Office Parks – Single use, land intensive with good highway access.</p>
 <p>Emerging Downtowns</p>	<p>Emerging downtowns are generally characterized as the economic, cultural and social centre of their respective communities. Emerging downtowns often contain educational and cultural facilities, transit access, limited high density office, residential development and many large and relatively unconstrained development sites. Emerging downtowns are increasingly seeing parking being used as a strategic approach to city building.</p>	 <p>Emerging Downtown - Mississauga City Centre - Parking lots impact walkability.</p>
 <p>Established Downtowns</p>	<p>Established downtowns are characterized as the primary centre of economic, social and cultural activity in a much wider urban region; as well as providing high density office space, high density residential development and accessible transit services. Office development often does not include underground parking, yet this is compensated by a wide range of access options. Commuters are accustomed to paid parking.</p>	 <p>Established Downtown – Toronto Financial District – In this context land is too valuable to support surface parking lots.</p>

Five strategy areas for pedestrian friendly development

The challenge of managing surface parking cannot be viewed in isolation. Rather, this challenge is inextricably linked to broader city building aims; intensifying commercial developments and reducing urban sprawl, building strong downtowns and urban centres, enhancing the public realm and providing the community with a range of mobility options. As a result, city builders will benefit from seeing this challenge holistically, working at various scales and with diverse stakeholders to adopt mutually reinforcing land use, transportation and parking strategies.

In working towards solutions to this challenge, city builders will benefit from working in five key strategy areas to:

- Reduce the supply of parking
- Better parking design
- Reduce demand for parking
- Find innovative ways to pay for high density parking infrastructure
- Manage parking as a long term asset

1. Reduce the supply of parking

The municipality can develop regulations to reduce parking supply, this would allow for increased and more intense floor plates and less area required for surface parking. The best practices strategies examined include: *Parking Maximums and Parking Caps*. The municipality can also build or encourage partnerships with or between the private sector and other agencies to realize parking reductions. The best practices strategies examined include: *Shared Parking*.

2. Better parking design

Better design of parking facilities can reduce the land area required to support parking, as well as the aesthetic and ecological contribution of the parking facility. Site planning can also be highly effective in achieving a positive design outcome and allowing for future intensification of the site. The best practices strategies examined include: *Parking Design Guidelines, Reducing Stall Dimensions, Vegetating Parking Lots and Site Planning*.

3. Reduce demand for parking

The municipality, developers, tenants, and employees all play a role in reducing the demand for parking and moving people towards alternative modes of transportation. However, underlying this challenge is a strong 'car culture' a real or perceived reluctance to move away from single occupancy vehicle trips and toward paid parking. The best practices strategies examined by this research include: *Transportation Demand Management (TDM) strategies*.

4. Find innovative ways to pay for high density parking infrastructure

The municipality can play a key role in developing financing tools that support investment in underground or above ground parking structures. The private sector also has opportunities to generate parking revenues. The best practices strategies examined by this research include: *Municipal Capital Investment, Cash-in-Lieu, TIF's/TIEG's and Pricing Parking*.

5. Manage parking as a long term asset

The municipality has a key role in managing parking structures to ensure parking investments have potential to become assets for the community or commercial sector. The private sector could also develop ways to finance its own parking

structures, by generating revenue from parking supply. The best practice strategies examined include: *Parking Authorities and Parking Pricing*.

City builders can select strategies to address these five strategic areas. City builders may benefit from the following approaches:

An integrated approach

Adopting a combination of strategies is critical as research revealed that the above strategies have modest individual impacts, typically reducing parking requirements by 5-15%, but their impacts are powerful and synergistic when combined.¹⁰ It is for this reason that city builders must examine and implement a combination of strategies, as cumulatively these strategies can reduce the amount of parking required at a destination by 20-40%¹¹, leading to all manner of economic, social and environmental benefits for urban centres.

The appropriate mix of strategies will differ greatly between urban areas. Strategies will need to be selected based on: the local vision, local champions, parking occupancy rates, levels of local investment, land prices, level of vehicle ownership and alternative travel mode availability.¹²

A practical and realistic approach

Transitioning from an automobile oriented community to a pedestrian oriented community is a long term process. It is extremely challenging to reduce automobile dependency when ample surface parking remains available, limited transit is in place

and a strong car culture persists. Therefore city builders must be realistic and practical in achieving their ambitions and show proactive leadership, ongoing commitment to changing behaviour and investing in alternative access options, flexibility, supportive and responsive regulations, as well as incremental investments in integrated parking options.

A collaborative approach

Retrofitting low density office parks and filling the gaps in emerging downtowns is a major undertaking and will require high levels of collaboration. Seeing the emergence of more pedestrian oriented neighbourhoods will be the result on many incremental changes and investments over a long period of time. The municipality cannot do it alone, nor can the private development sector. Innovative partnerships between the public and private sector and ongoing dialogue between all stakeholders and the community at large will be crucial to seeing transformation towards pedestrian oriented development on the ground.

A strategic approach

There are a growing number of cities that are strategically investing in parking facilities to unlock development potential and achieve a pedestrian oriented built form. These city builders are showing increasing levels of leadership and taking on both the economic risks and rewards associated with building their own high density parking facilities. However, these progressive approaches to city building are largely present in a downtown context and efforts remain slow and less coordinated in a commercial office park context. It will be important that similar efforts are applied to lower density suburban areas into the future.

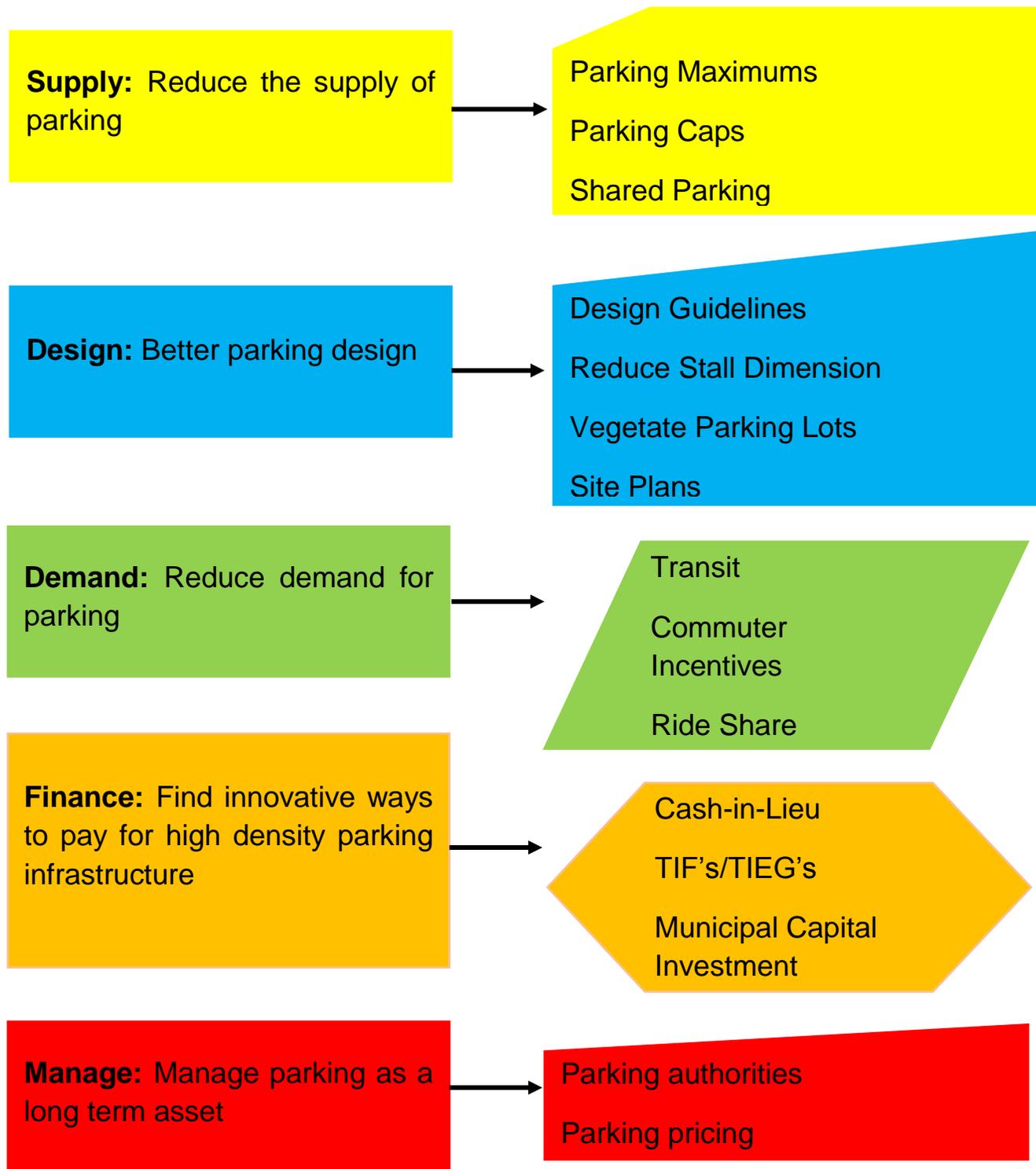
¹⁰ Litman, Todd. 2011. *Parking Management Strategies, Evaluation and Planning*, Victoria Transport Policy Institute. Available: http://www.vtpi.org/park_man.pdf.

¹¹ Ibid

¹² Metropolitan Transportation Commission. 2007. *Reforming Parking Policies to Support Smart Growth*. Available: http://www.mtc.ca.gov/planning/smart_growth/parking/parking_seminar/Toolbox-Handbook.pdf.

Five Strategy Areas

Strategies Examined



Reduce the supply of parking

Municipal regulations play a key role in achieving higher density and mixed use development in cities. Regulations heavily influence the location of commercial growth and generally specify the amount of vehicle parking to be associated with this growth. Yet traditionally, parking provision has often been based on peak demand, rather than parking required on a typical day. If a municipality adopts overly generous parking requirements, this will inadvertently lead to urban expansion and sprawl and greater land areas will be occupied by parking spaces. Municipal regulations must be mindful of this responsibility and be able to balance citywide aims of intensification with local development feasibility, land ownership patterns, site and neighbourhood characteristics, location features and market conditions.

Integrating Transportation and Land Use Policies

City builders across North America are widely promoting compact and pedestrian oriented cities, yet at the same time sprawling developments and surface parking lots are enabled through municipal planning regulations. More specifically, planning policies have often facilitated significant decentralization of the office market. The Greater Toronto Area's (GTA) '905' suburban office market provides a third of the region's office space (66-million sq. ft – more office space than in Calgary and Edmonton combined) and employs over 325,000 office workers, but provides limited or no public transit connectivity. This lack of integration between transportation and land use planning is compounding gridlock across the GTA. Creating stronger integration between land use planning and



The City of London in Ontario and the City of Regina in Saskatchewan both have impressive skylines for cities of their relative sizes. This is partly due to municipal policies directing large scale office growth to their downtown cores, creating a more centralized and pedestrian oriented downtown.



A new portion of LRT line was constructed in Pittsburgh, thanks in large part to private sector sponsorship. Riders can now travel from Gateway to Allegheny for free.

In 2010, Allegheny County, Pennsylvania sent out a worldwide appeal to find private investors willing to invest in Pittsburgh's transit system in exchange for development rights. The Urban Redevelopment Authority (acting as an agent for assembling properties for the County) offered private entities the right to develop land along the routes. At the time of writing this report the full extent and design plans remained confidential, however this provides an example of land-for-transit offer.

Also stemming from this process, a 2 km extension of North Shore 'T' Line was constructed and two new stations were built to service two arenas and associated entertainment facilities in Pittsburgh. This project occurred thanks in large part to sponsorship from the Pittsburgh Steelers, Rivers Casino, ALCO Parking Corporation and the Stadium Authority of the City of Pittsburgh. Today, Pittsburgh patrons are able to ride for free on the recently completed portion of the North Shore Line, allowing access to the two arena facilities from the downtown.

transportation planning will be crucial to the strength of urban regions.

Feedback from Development

Community: Higher levels of integration between municipal departments would be welcomed by private developers. Many interviewees reported that they often receive conflicting advice from different municipal departments, which creates frustrations and a lack of trust during the approvals process.

Limiting Parking Provision

Municipalities can control the amount of surface area being used for parking by setting limits on the total amount of parking spaces per development '**Parking Maximums**,' or in a certain area '**Parking Caps**'. Such regulations require research and planning efforts by the municipality to ensure that the restriction is appropriate and would not hinder development opportunities, but if done properly, these strategies can be very successful in minimizing the land area used for parking and encouraging use of public transportation. Effectiveness of these strategies would be maximized if neighbouring municipalities adopted a similar approach and worked together to limit surface parking regionally.

Feedback from Development

Community:

Developers held highly divergent views on parking provision. Some developers felt that the local municipality was "*forcing them to overbuild parking*," while another respondent commented that "*parking requirements are forcing us to under-build parking*."

A gap also exists between the requirements of planning authorities and demands of future tenants, and the developer is generally stuck in the middle. Reluctance

from developers to reduce parking requirements is largely driven by a very real fear that they will not be able to secure tenants without a high ratio of parking. In response, some developers said that they would be grateful for Parking Maximums, as it levels the playing field and means they simply cannot meet unrealistic demands for parking.

Developers also expressed that if municipalities do work to limit the supply of parking, they may want to come up with other ways to support new developments, e.g. investing in improved transit and upgrading the public realm. Municipalities must also understand that they are taking some risk by limiting parking provision, as in some instances developers said that if they cannot provide the amount of parking they want to provide, they could go elsewhere.

"We had a prospective tenant that wanted to locate in our city centre, but they chose not to because of the parking requirements, as we [the municipality] set Parking Maximums to bring down the amount of parking in the core, they ended up moving to one of our suburban office parks."

Municipal Transportation Expert

Shared Parking

Shared Parking can significantly improve the economics of constructing new parking by supporting multiple uses and a greater turnover of users each day. Shared parking is based upon the concept of using the same parking spaces for two or more different land uses that require parking at different times of the day. If payment charges are placed on parking, this higher turnover can increase revenue generated by the facility. Shared parking arrangements could also reduce the amount of land devoted to parking, which would in turn

decrease costs for developers, create more opportunities for mixed use development and allow for creative site planning and landscaping.

Shared parking could be administered formally, through municipal zoning regulations or by-laws. Regulations could allow shared parking to meet minimum parking requirements for uses located within the same lot or building and also permit off-site shared parking arrangements to meet on-site parking requirements for complementary uses within a defined area. Alternatively, with the support of the municipality, less formal arrangements could be implemented through agreements between individual developers and land owners.

Opportunities for shared parking are growing as we see a rise in mixed use developments. One developer interviewed was engaged in a large scale redevelopment that included commercial, retail and office components. This firm was incorporating shared parking into their development to provide lower parking rates, but maximize use of the parking supply at all times of the day.

Feedback from Development Community: The development community expressed concerns over marketability if they did not provide onsite parking. They also noted that formal partnerships could place longer term constraints on their site's development potential. Yet at the same time, developers generally welcomed opportunities to intensify development of their sites. Overall, there was consensus that shared parking would need to be considered on a site by site basis taking local circumstances into account, such as access options and critical mass.



Making full use of existing parking for shared uses prevents the need for new parking which can be expensive and land-consuming.



The Markham Centre parking strategy has reduced the parking requirement for office uses, introduced parking maximums and requires a significant portion of parking to be provided within structures. This case study is discussed on page 28.



Vancouver's Transportation Plan capped downtown parking provision at 1997 levels. These Parking Maximums have continued to be reduced over time. These strategies have been supported by major transit investments, such as the Canada Line and improvements to the public realm and cycling infrastructure.

Better parking design

Guidelines and Standards to Improve Parking Design and Aesthetics

Municipalities and developers can encourage high quality and more efficient design of parking lots, preventing the “deleterious visual effects”¹³ of surface parking. Municipalities could develop **Design Guidelines** to improve the design response of new development applications. For example, these guidelines could influence the position of a building on a site to promote better pedestrian access. Regulations could also be developed to allow for **reduced stall dimensions** creating more compact car spaces, reducing the overall area of land required for parking. **Vegetating surface parking lots** also has the potential to improve their ecological and aesthetic qualities. If structured parking is developed, it can also be sensitively designed to engage with its surroundings and accommodate ecological design features.

Feedback from Development Community: Developers welcomed cost effective strategies to improve quality of design. Developers were particularly supportive of the idea of reduced parking lot dimensions. However, they cautioned that creating design guidelines could increase the construction and development costs associated with a proposal and it is important that these guidelines do not impact development feasibility.



Reducing parking lot dimensions can decrease the land area required to support parking, it can also encourage the use of smaller vehicles.

The City of Vancouver is encouraging lower emitting and smaller vehicles by providing free scooter parking. The City also has a Pay-by-phone option for meter parking providing drivers with the choice of cash free transactions through technology.



Efficient multi parking solutions can also reduce land areas needed to support parking and maximize areas of underground parking. Use of valet parking, particularly during busy periods can also have the similar result.



Strategically sloped vegetated strips (bioswales) are a better option than conventional grassy parking islands for collecting storm water runoff.

This can improve the ecological response of surface parking.

¹³ Feitelson, E., and Rotem, O. 2004. *The case for taxing surface parking. Transportation Research Part D*, 9: 319-333. Pg.320.

Better Site Design to Allow for Pedestrian Accessibility and Future Intensification

Collectively, the design of individual commercial office buildings has a major impact on the evolution of neighbourhoods. In the past, commercial office buildings have often been centrally sited and are surrounded by surface parking. This layout makes it difficult to access the building on foot and can create real challenges for intensifying or retrofitting the site into the future. Municipalities do have opportunities to influence the design of the site from the outset to ensure that even lower density, single use neighbourhoods can transition toward becoming more pedestrian oriented.

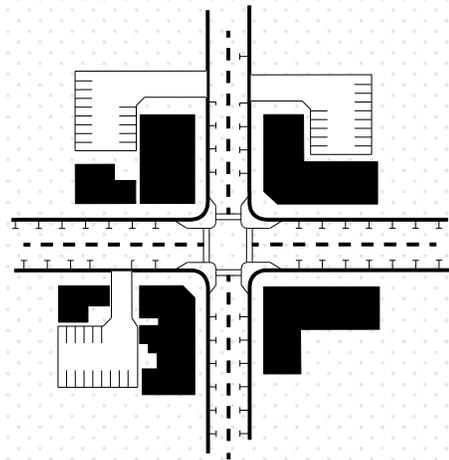
In Ontario, the **Site Plan Approval** process examines design and technical aspects of a proposed development to ensure compliance with municipal requirements, standards and objectives. Site Plan applications are reviewed with respect to a range of considerations, but specifically transportation, transit, urban design, landscaping, accessibility and environmental conservation. This process therefore provides municipalities with a significant opportunity to influence the placement of a proposed development and the way it interacts with its surrounds.

Feedback from Development

Community: Developers welcomed the opportunity to work through design issues with municipalities from the outset of their application through the site approvals processes. Developers stated a preference for dealing with design issues at the beginning of an application process, rather than mid-way through or towards the end of the process.



Many office buildings in commercial office parks are not sited in a way that will allow for easy pedestrian access and support future retrofitting or intensification opportunities.



Rather, office building could be positioned from the outset in ways that would allow for greater pedestrian access and future intensification. This could occur through the site planning process.



USA's Santa Monica Civic Centre is not only an attractive design, it's also the first LEED-certified parking garage.

Reduce parking demand

Changing behaviour and encouraging commuters to consider alternatives to the personal vehicle can help reduce parking demand. While reducing demand does not directly contribute to the development of high density parking structures, it does minimize the need for parking spaces and hence can contribute to pedestrianization of the public realm and/or reduce parking construction costs. In some instances, reducing parking demand has been so successful that surface parking lots have been redeveloped for higher and better uses. The suite of policies applied to reduce parking demand is known as Transportation Demand Management (TDM) strategies.

Transportation Demand Management (TDM)

Traditionally, transportation strategies have addressed increased demand for parking by supplying more parking. However, **TDM** departs from this approach and focuses on reducing the demand for parking by reducing the number of single occupancy vehicles trips. Public and multi-modal **transit** is likely to be the most popular and well known TDM option. Yet TDM includes a wide range of strategies to create and motivate people to utilize a diverse range of access options.

“Suburban areas need to recognize that transit cannot solve all of their problems...a business park can reduce 25% of trips through moderate TDM effort.”

- North American Transportation Specialist

Incentives can be provided to reduce employee demand for parking. One way to do this is known as ‘cashing out’ – offering employees a sum (say \$50 per month) for not using a parking space on site, which according to Litman (2006) typically reduces



Power Stream’s Vanpooling

Power Stream’s van pooling program allowed for 35 employee vehicles to be replaced with four vans; reducing fuel costs, emissions and car parking spaces required to support the workforce. Vanpools service different areas within the northern part of the GTA and connect the company’s head office in Vaughan, and operations centre in Markham.



Car Sharing Programs

To prevent the need for individuals to drive a personal vehicle to work, car share vehicle/s could be integrated into office parking lots. This would allow for employees to have access to a car during the day to attend meetings etc and support other TDM measures.



Hatch Ltd’s Commuter Incentives:

Hatch Consulting adopted a range of TDM measures to address its onsite parking shortages. These included subsidies for car pooling and bike use, as well as working with the City of Mississauga and Mississauga Transit to a revise bus route to allow for better access.

This program was successful at reducing the number of single vehicle trips to the office.

parking requirements by 20%.¹⁴ This could theoretically free up land for more intensive development. **Ride sharing** and **van pooling** has also been highly successful at reducing traffic congestion. **Cycling** is also growing as a viable option in suburban areas. These approaches are simple but highly effective ways to not only reduce the need for parking but also save money, reduce congestion, conserve energy and promote healthier lifestyles.

Feedback from Development Community: On average, developers were highly supportive of TDM strategies – particularly transit investment. Yet many voiced apprehensions about designing new developments in anticipation of transit, holding concerns that the proposed transit may never materialize. Some interviewees even recalled instances of working closely with municipalities and transit authorities to integrate their new developments with proposed transit routes that ultimately never came to fruition.

Developers generally expressed support for other TDM measures, such as van/car pooling. However, they frequently discussed a reluctance to integrate these measures into suburban projects, believing they would be premature due to a strong ‘car culture.’ Developers were looking for logical solutions and flexibility as the suburban areas transitioned to be more pedestrian oriented.

Developers frequently said many people want to own a car; it is part of their lifestyle.

While developers acknowledged a transition away from the car in suburban areas would need to be achieved at some point in the future, it was widely held that municipalities should not be forcing people out of their cars, but providing better infrastructure so residents and workers have choice. Another factor noted – which could contribute to this cultural and behavioural shift – is the up and coming “urban generation... [that] don’t want to own a car and have to commute an hour every day.”

University of British Columbia (UBC) unlocks development potential with TDM¹⁵

UBC in partnership with Translink and the Province of British Columbia established a highly successful TDM program. This program coupled the U-Pass (a discounted travel pass subsidized by the Province that is available to Vancouver’s post secondary students,) with frequent rapid bus services (operated by Translink) and higher parking rates at the main UBC Campus. These TDM initiatives have led to a reduction of 7,500 single occupancy vehicle trips since 1997 and reduced the need for parking spaces, allowing for the redevelopment of some surface parking lots.

For example, The Institute of Asian Research is housed in the C. K. Choi Building, which was built on a former surface parking lot. This building is recognized for its leading-edge sustainable design and is often called a ‘living laboratory.’ The university has identified several other surface parking lots as key sites for future expansion.



¹⁴ Litman, Todd. 2006. *Parking Management Strategies, Evaluation and Planning*. Available: <http://www.reconnectingamerica.org/assets/Uploads/bestpractice137.pdf>. Accessed 2012 July 5.

¹⁵ Price, Gord. 2011. *U-Pass gets people off the road and into transit. The City Caucus*. Available: <http://archive.citycaucus.com/2011/04/u-pass-gets-people-off-the-road-and-into-transit>.

Invest and find innovative ways to pay for high density parking infrastructure

Creative approaches to finance parking are not wide spread in North America. This is largely due to an expectation of ‘free parking’. This makes financing high density parking one of the most challenging parts of parking development. Constructing parking spaces costs a minimum of \$2,000 for a surface parking space, ~\$30,000 for a structure parking space and ~\$60,000 for an underground parking space.¹⁶ To determine the full cost it is also important to consider land costs, revenues collected, operating costs, amortization rate and environmental externalities. The cost of parking also needs to consider the highest and best use of land.¹⁷ The public sector can play a major role in creating the economic conditions to support investment in high density parking.

Tax Based Incentives

Cash-In-Lieu essentially allows developers to buy out of certain parking requirements of their new build in exchange for a payment to the municipality. The financial return received by the municipality can then be used to finance paid parking facilities in place of private spaces or public transit development. They can be considered as similar to, if not the same as, development charges. New developments making these payments are required to pay a certain fee per square foot of new development to fund

public infrastructure, which in this case would be parking.

The cash-in-lieu method is a highly effective at the ‘established downtown’ scale because transit is in place, land is scarcer and developers feel more secure in their decision to provide less parking. Yet similar approaches could be provided at lower density scales, so long as alternative access options are available.

Feedback from Development Community:

Developers were generally supportive of providing less parking, if they believed that other high quality site access options were available. However, they expressed concerns over providing lower parking rates in a suburban context, believing that that this approach could impact their resale value.

This view was reinforced during a discussion with a municipal staff member who administered a citywide cash-in-lieu program. She said that utilization rates of their cash-in-lieu program were relatively low for commercial developments in suburban settings. This again highlights the need for cities to adopt a comprehensive and mutually reinforcing range of strategies.

Downtown Oshawa’s Brownfield Redevelopment

In the early 1990’s downtown Oshawa was in a state of decline, with high levels of vacancies and many empty sites that were either contaminated or perceived to be contaminated, creating a major barrier for redevelopment. In response to this challenge, the city borrowed \$18M to build an eight story, 750 stall municipal parking structure, the Mary Street Garage. Extra funds were spent for the design of the garage. The municipality then worked at remediating 12ha of brownfields sites, by generating a land-bank and building partnerships. The private sector was attracted to further invest in the downtown, especially since parking provision had already been met for many new developments. This integrated approach worked at reversing the decline in the downtown and attracted diverse new users, the YMCA, a retirement residence and a diverse range of new businesses.

¹⁶ As per averages calculated on page 6 of this report.
¹⁷ Metropolitan Transportation Commission. 2007. *Reforming Parking Policies To Support Smart Growth, Toolbox/Handbook: Parking Best Practices & Strategies For Supporting Transit Oriented Development In the San Francisco Bay Area*. Available: http://www.mtc.ca.gov/planning/smart_growth/parking/parking_seminar/Toolbox-Handbook.pdf. Accessed 2012 July 12.

Municipal Investment

Municipalities can invest some or all of the capital required to build structured or underground parking. This approach could also involve the municipality entering a joint venture with senior levels of government, or with a private developer who could invest in a parking facility as a means of meeting their parking requirements. Once the municipality has repaid its debt, they will continue to generate financial returns from this major asset. New parking facilities can foster new developments on existing surface parking lots, which will in turn, grow the municipality's tax base.

Feedback from Developers: Developers were highly supportive of public investments in parking structures, and considered that such investments could lead to increased land values and development opportunities. Developers suggested that this approach would be optimal in an emerging downtown, where there is transit access, a critical mass of activity and redevelopment opportunities. Yet, they believed that this approach could be applied in a suburban office park where there was a critical mass of activity or a mix of land uses.

Pricing Parking

Parking has never been 'free' and the true and often hidden costs have been carried by all members of the community.¹⁸ In 1995, a national survey of employer parking capacity was undertaken in the United States. It estimated that 84% of the spaces in employer-owned facilities are surface lots, 11% are in above-ground structures and 5% are underground.¹⁹ Applying this

¹⁸ Shoup, Donald C. 1997. *The High Cost of Free Parking*, Available: <http://www.uctc.net/papers/351.pdf>

¹⁹ Transportation Research Board. 2003. *TCRP Report 95: Chapter 18 – Parking Management and Supply: Travelers Response to Transportation System Changes*.



A new parking facility (Carlisle Garage) opened at the beginning of 2012 in downtown St Catharines, Ontario. This project received funding from all three levels of government and provides 500 above ground and 100 below ground parking spaces. This parking garage is intended to support a new range of uses, such as a proposed arena downtown.



The City of Fredericton spearheaded the development of the new 529 spaced East End Parking Garage. This facility was constructed in conjunction with the downtown Convention Centre while supporting a neighbouring office building. This garage has been developed with the long term plan that it will be able to provide parking for new developments happening in the downtown core into the future.



The City of Mississauga has set an example, by charging for underground parking at City Hall as of 2011. Modest parking fees (\$1 per hour prior to 6pm) are now being charged to encourage workers and other patrons to make use of transportation alternatives that serve the City's downtown core.

distribution, an average monthly cost of \$84.48 per space was calculated. Thus, any employer who is or is planning to provide parking for employees could expect to pay roughly \$85 per month on average. The 1995 national survey also found only 0.1% of all employers charge for employee parking, and that those who do charge an average of \$62.69 per month.²⁰ Thus, there is very little revenue generated by employee parking.

More than 15 years have passed since this survey was undertaken in the USA. Nevertheless, from CUI's research there is little evidence to indicate that the trend of employers charging for parking has changed over the past decade. Free parking represents a lost opportunity to generate revenue that has the potential to go a long way toward financing high density parking and/or other important TDM strategies.

Feedback from Development Community: Developers explained that there were a multitude of challenges associated with charging for private office parking as a means of financing high density parking structures. Firstly, they explained this approach would not provide them with the capital they required from the outset to be able to construct high density parking. Secondly, developers typically sell a building following construction, so they would be unable to generate revenue to compensate for the initial investment on an ongoing basis. Thirdly, they explained that they rarely manage buildings so they would not be able to implement parking charges. In the instances where they could, they believed that parking charges would

dramatically reduce the marketability of the building and not be sufficient to cover costs associated with their investment in the short term.

Given these unfavourable economic conditions, one developer suggested that this could be an opportunity for a public private partnership. The proposed model would allow the developer to build the parking structure and the municipality could then purchase it. The municipality could recoup this investment by charging for parking on an ongoing basis. This could be managed through the establishment of a municipal parking authority. This approach would involve the municipality taking on significant risk, yet the municipality would be rewarded through the creation of an urban form that will facilitate more intense and pedestrian oriented development forms and an ongoing source of revenue.

“The Achilles’ Heel to TDM is the oversupply of free of charge parking.”
– Municipal Transportation Expert

Parking Space Levy in Sydney, Australia



In Sydney, a Parking Space Levy of AU\$800 per stall is currently applied annually to parking in the central business district (CBD) and AU\$400 per stall at other business districts. The levy applies to all privately owned, non-residential off-street parking. It is prorated for parking facilities that are used only occasionally i.e. a place of worship. The levy raises more than AU\$40 million annually, which is dedicated to transportation projects and cannot be used for operating expenses.

²⁰ Transportation Research Board. 2003. *TCRP Report 95: Chapter 18 – Parking Management and Supply: Travelers Response to Transportation System Changes*. Available: http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_95c18.pdf (Pg. 18-23).

Manage parking as a long term asset

Structured and underground parking can cost \$30,000 - \$60,000 per stall.²¹ Yet, typical revenue (utilizing an average of monthly rate of \$236 per space²²) can make it challenging to support these substantial costs, particularly in the early years of operation until occupancy has stabilized and monthly rates have matured. Therefore effectively managing and pricing parking is critical to ensure it can serve as a long term asset into the future.

“Downtown Calgary been driven by pricing. They have some of the highest commercial parking values in the country, if not North America and it has allowed their transit service to be extremely successful.” **Municipal Transportation Expert**

Managing Parking Assets

Municipal Parking Authorities are municipally owned corporations with the intent of providing competitively priced off-street and on-street public parking to serve main streets and neighbouring residential areas. A portion of the revenue generated by these parking sites is used for further development of new parking lots while the rest is transferred to the municipality. These parking authorities are typically charged with enforcing and ticketing their own lots which contribute to revenue along with standard metering collection. Established cities often have parking authorities, yet emerging cities could consider the potential revenue generation and employment opportunities offered by this model.

²¹ Please refer to table on page 6 for determining average costs.

²² Margot, Ben. 2011. *Calgary parking fees 2nd highest in N. America*, CBC News. Available: <http://www.cbc.ca/news/business/story/2011/07/13/calgary-parking-rates.html>.

Monthly downtown parking rates in 12 Canadian cities		
	Rate	Change from 2010
Calgary	\$473	4.2%
Toronto	\$332	-1.2%
Montreal	\$296	5.6%
Vancouver	\$288	7.9%
Edmonton	\$275	0.0%
National Average	\$236	2.6%
Ottawa	\$195	-6.6%
Victoria	\$185	2.7%
Saskatoon	\$170	1.8%
Regina	\$168	3.2%
Halifax	\$167	5.4%
Winnipeg	\$152	0.0%
Kitchener-Waterloo	\$128	9.7%
Source Colliers International		
http://www.cbc.ca/news/business/story/2011/07/13/calgary-parking-rates.html		

“Paid parking is controversial...but it can be key to paying for a lot of your other measures.” – **Transportation Specialist.**



The City of Calgary adopted a policy that limits the amount and location of downtown parking. Recent development has consumed most former surface parking lots in the downtown, thereby further limiting parking availability in the core. This case illustrates how the control and limitation of parking has led to high parking prices that discourage automobile usage. Combined with limited roadway capacity, this high priced long-term parking affirms public transit as an increasingly attractive option for downtown workers to traverse the core. Much of the strategically located structured parking is managed by the municipal government.

Effectively **pricing parking** (through a user pay system or metered parking) is a critical consideration for effective management of parking assets and will essentially fund the creation of the parking authority. Effectively pricing parking can provide numerous benefits including increased turnover and therefore improved user convenience, parking facility cost savings, reduced traffic problems, and increased revenues. While under pricing parking increases the amount of parking needed to meet demand, and tends to increase problems such as traffic congestion, housing affordability, sprawl, and pollution.²³

Feedback from Development Community: Developers were relatively neutral in relation to establishing parking authorities, seeing this as a municipal responsibility. However, some interviewees emphasized that if higher rates are to be charged for parking then alternative access options must be available.

Municipalities saw parking authorities as being crucial in the emergence of stronger downtowns. Municipalities also had a strong awareness that having high levels of control over the parking supply and pricing could have a major impact their success in implementing all manner of complimentary parking management strategies. Calgary was highlighted as a city that has been able to strengthen its downtown and its citywide transit system, through effective management of its parking assets.

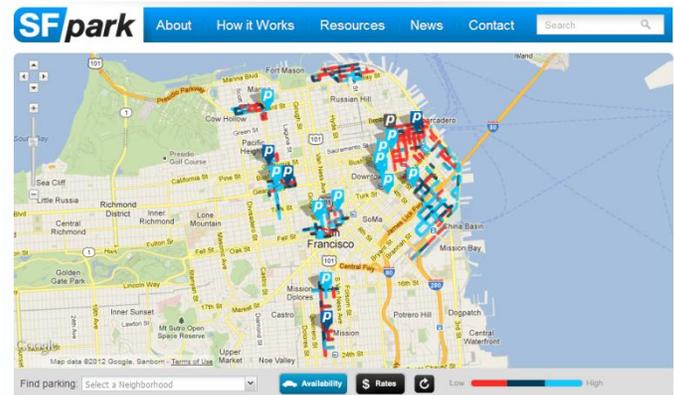
²³ Litman, Todd. 2011. *Parking Pricing Implementation Guidelines*. Victoria Transport Policy Institute. Available: <http://www.vtpi.org/parkpricing.pdf>.

²⁴ San Francisco Municipal Transportation Agency. 2012. *SFPark*. Available: <http://sfpark.org>.

Saskatoon – The Partnership

The Partnership (Business Improvement District) in downtown Saskatoon, Saskatchewan, has a portion of municipal parking revenues set aside for streetscape upgrades. The redevelopment of 21st Street is just one of the many streets that has benefited from these funds.

San Francisco’s ‘Smart Parking’²⁴



Real Time Parking Map for San Francisco

SFPark system utilizes demand-responsive pricing, to encourage drivers to park in underused areas and garages, reducing demand in overused areas. SFPark works by collecting and distributing real-time information (e.g. through the SFpark website or iPhone app) about where parking is available so drivers can quickly find open spaces. To help achieve the right level of parking availability, SFPark periodically adjusts meter and garage pricing up and down to match demand. Rates will change as often as once a month, dropping to as little as \$.25 per hour in places where demand is low and rising to as much as \$6.00 per hour on the most congested city blocks. The aim is to have 15% of parking spaces open at all times of approximately one open space on every block, to reduce the number of cars circling to find parking and increase traffic congestion.

A further selling point of this program is that it reduces the need for time restrictions, and in some locations time limits have been removed altogether. The SFMTA said, “SFpark will use demand-responsive pricing rather than short time limits to achieve parking availability goals.”

Selecting the Optimal Strategies

This matrix summarizes the strategies outlined in this report and the optimal contexts for their application. These strategies are discussed in greater detail in the ‘Case Studies’ section that follows.

	Leader(s)	Individual Office Building/Cluster	Suburban Office Park	Emerging Downtowns	Established Downtowns
Reduce Supply of Parking					
Parking Maximums	M	X			
Parking Caps	M		X	X	X
Shared Parking	M T D	X	X	X	X
Improve Design of Parking					
Design Guidelines	M	X	X	X	X
Reducing Stall Dimensions	M T D	X	X	X	X
Vegetating Parking Lots	T D	X			
Site Planning	M D	X			
Reduce Need and Demand for Parking					
Transit	M		X	X	X
Commuter Incentives	D T E	X			
Ride Share	D T E	X	X	X	
Find innovative ways to pay for high density parking infrastructure					
Cash-in-Lieu	M D	X	X	X	X
TIF's/TIEG's	M D	X			
Municipal Capital Investment	M		X	X	X
Parking pricing	M T D	X	X	X	X
Manage parking as a long term asset					
Parking authorities	M		X	X	X

- M Municipality
- D Developer
- T Tenant
- E Employee

Individual Office Building

Good planning is the key to building stronger and more pedestrian oriented commercial developments. The research demonstrated that site planning can go a long way to improving the design response of an individual development application and also increase opportunities for retrofitting and intensifying a site into the future.

Improving the design and siting of a building can create a more positive relationship with the streetscape and increase pedestrian accessibility. Moreover, simple cost effective measures to enhance surface parking lots, such as increasing the amount of vegetation, expanding permeable areas and varying the size of parking spaces can lead to more visually interesting surface parking lots that are supported by lesser land area.

Individual developments can also benefit parking maximums, as it caps the number of parking spaces and reduces the area needed to support surface parking. This measure can also provide regulatory support to developers that are looking to reduce the number of spaces associated with their development but are unable to do so due to pressure from commercial real-estate brokers and/or future tenants. This measure creates a more level playing field in the development of office space.

Encouraging the establishment of TDM programs and a range of site access options can also help reduce the area required to support surface parking.

Office Park or Cluster

A cohesive vision that is supported by a suite of complimentary strategies and investments is critical to intensify and increase the walkability of an office park. Research demonstrated that the revitalization of an office park will likely only occur when there is strong political will and high levels of coordination between efforts to diversify mobility options, enhance pedestrian oriented design features and attract new commercial growth. Yet even under these ideal circumstances, progress can be slow, as current land economics will simply not support the creation of higher density parking in a suburban office park.

Therefore, municipalities would be well served to focus on encouraging the development of office parks in ways that would allow for retrofitting and intensification of office parks into the future. Design guidelines and effective site planning could contribute to these ends. As time goes by and economic conditions change, municipalities could then start to use parking as a strategic tool to encourage redevelopment of these office parks, looking to some of the examples set in an emerging downtown context. These investments should also be coupled with increased access options, transit investments, enhanced design and an openness to partnerships with the private sector.

Emerging Downtown

City builders working in emerging downtowns have been strategically investing in high density parking as a means to achieve downtown revitalization goals. There are many excellent examples of municipal investments in parking structures to support new developments, particularly commercial developments, as it allows for reductions in parking provisions, which in turn increases development feasibility. This leadership is highly commendable and has created a wide range of benefits for the municipality into the long term.

For example, one benefit stemming from this approach is that if the municipality has a high level of control over the downtown parking supply, this can increase their ability to implement all manner of complimentary parking management strategies. Calgary was often highlighted as a city that has been able to strengthen its downtown and its citywide transit system, through effective pricing and management of its parking assets.

Emerging downtowns will also benefit from strong partnerships between land owners, tenants, developers, the municipality and other agencies. These partnerships will help maximize use of existing parking provision and reduce the needs for additional parking supply. The effectiveness of shared parking, capped parking and joint investments will increase from high levels of collaboration between diverse city builders. These efforts will also need to be supported through providing an increased range of access options.

Established Downtown

High density parking is also a costly proposition in an established downtown context. Economic conditions may be in place to provide some structured or underground parking as part of new office development; yet these office developments are not providing high parking ratios to meet the needs of a large portion of employees. Rather, established downtowns have a high density of activity, lots of amenities, high levels of walkability and a wide range of access options that allows for the provision of parking at much lower rates. This is an important point to make, as reducing the demand for parking will be crucial to increasing the financial feasibility of high density parking structures.

Case Studies

Tyson's Corner, Virginia - Transforming a Business Park into a Mixed-Use Downtown



"By 2050 Tysons will be transformed into a walkable, green urban centre. It will be home to up to 100,000 residents and 200,000 jobs in that year." – Fairfax County, Virginia. (25)

Aerial shot of Tyson's Corner

Nestled between two state highways and located 12.5km west of Washington D.C.'s CBD, Tyson's Corner has rapidly evolved from a rural highway intersection to the quintessential post-war suburban office park. It is now among one of North America's largest business districts and is the nation's twelfth largest employment centre.²⁵ Tyson's Corner is a classic example of an 'edge city' with sprawling parking, car-oriented design (~160,000 car parking spaces serve ~170,000 jobs) and a lack of pedestrian connections. Combined, these factors represent a barrier to

cultivating increased density within this suburban centre.^{26,27}

Nearly eight years ago, Fairfax County launched a two-phase project, the Comprehensive (or Tysons) Plan, to retrofit the swaths of mono-functional surface parking lots that comprise a considerable proportion of the centre's land area. The first phase of this project is to be completed by 2013.

The plan was catalyzed by the impending 37km extension of the Silver Line of Washington's Metropolitan Regional Transit System. Phase one of this project involves the establishment of four stations in Tysons Corner.

While the Silver Line has prompted leaders to reconsider the diverse impacts of surface parking lots, aspects of this endeavour remain problematic. This development is particularly illustrative of the 'last mile' problem, where those disembarking at one of the new transit stations need to travel about a mile to access most of the office buildings. This initiative was envisioned to embody **Transit Oriented Development** (defined as "a mixed-use community that encourages people to live near transit services and to decrease their dependence on driving").²⁸ However, it is more likely this phase will align with the defining features of the more pejorative **Transit Adjacent Development**, a term used by California

²⁵ Meyer, Eugene. 2008. *A Shopping Nexus Outside Washington Plots a Future of an Urban Centre*. New York Times. Available: http://www.nytimes.com/2008/12/17/business/17tysons.html?_r=1

²⁶ Freemark, Yonah. 2009. *Finding the Funding for Metro to Dulles Airport*, The Transport Politic. Available: <http://www.thetransportpolitic.com/2009/10/02/finding-the-funding-for-metro-to-dulles-airport/>.

²⁷ Kenton, Malcolm. 2011. *Tysons highlighted as global example for smart growth*. Greater Greater Washington. Available:

<http://greatergreaterwashington.org/post/8992/tysons-highlighted-as-global-example-for-smart-growth/>.

²⁸ Carlton, Ian. 2007. *Histories of Transit-Oriented Development: Perspectives on the Development of the TOD Concept*. Available: <http://www.iurd.berkeley.edu/publications/wp/2009-02.pdf>.

transit expert Robert Cervero. This transit paradigm fails to draw people away from the comfort of the car. Although development still occurs in close proximity to transit, its design is independent from this infrastructure.²⁹ A primary feature of this development style is free and abundant parking.

An amendment to the Comprehensive Plan was adopted in June 2010 following public consultation concerning the proposed Tysons Corner stations.³⁰ This revision of targets increased focus on redeveloping Tysons' abundant dead space and acres of parking, underutilized connections, and the problematic 'last mile'. It proposed a plan for a new, mixed-use, urban centre comprised of new residential, commercial and office space, which is envisioned to function as Fairfax County's downtown.

The plan's commitment to addressing Tysons Corner's oversupply of surface parking, an issue poorly addressed exclusively by the new transit stations, is particularly noteworthy. It outlines methods for transitioning to Transit Oriented Development and pursuing intensification strategies where three quarters of new development is to be within a 10 minute walk from a station.

The plan delineates eight main districts, four of which are increasingly dense 'villages' that surround the stations. These districts are functionally unique. Each serves an important role, ranging from a transit gateway, an office space hub, shopping destination, and residential community. All new development replaces existing surface

parking.³¹ Targets for higher percentages of office and commercial use closer to the stations are also included. These benchmarks were established with the intent of drawing people to the area, and spur more residential use further away from these sections. This residential development attracts people who want and value close proximity to their workplaces and is a crucial component to creating a successful mixed-use urban centre in this suburban landscape. Alternatively, it will increase housing availability in Fairfax County's lower density and desirable areas whilst still being accessible to their workplace.³²

The creation of a 2,300 space underground parking³³ structure at the final stop of Phase One, Wiehle Metro Station, generates a metro hub for intensification creating a destination space.³⁴ In addition, the new rail stations are already prompting significant regional investment.

Retrofitting Tysons Corner is also supported by Tysons Partnership, a non-governmental organization that performs the vital role in the remediation of surface parking by generating civic engagement and collaborations between the public and private sectors.³⁵ This facilitation has led to

²⁹ California Department of Transportation. 2000. *Transit Oriented Development (TOD) Searchable Database*. Available: <http://transitorienteddevelopment.dot.ca.gov>.

³⁰ Government of Fairfax County, VA. 2010. *Tysons Comprehensive Plan*. Available: <http://www.fairfaxcounty.gov/tysons/comprehensiveplan>.

³¹ Alpert, David. 2008. *Transforming Tysons with four unique districts*. Greater Greater Washington. Available: <http://greatergreaterwashington.org/post/1228/transforming-tysons-with-four-unique-districts/>.

³² Government of Fairfax County, VA. 2010. *Land Use – Transit Oriented Development*. Available: <http://www.fairfaxcounty.gov/tysons/comprehensiveplan/landuse.htm>.

³³ Huggins, Cathy, Board Supervisor for the Hunter Mill District, Tysons Corner Comprehensive Development Plan. 2012 May 31. Personal Communication.

³⁴ Government of Fairfax County, VA. 2012. *Wiehle Metro Garage*. Available: <http://www.fairfaxcounty.gov/living/transportation/wiehle-metro-garage/>.

³⁵ Government of Fairfax County, VA. 2012. *Tysons Partnership*. Available: <http://www.fairfaxcounty.gov/tysons/implementation/partnership.htm>

large scale developments and private sector investments, including the development of urban street guidelines. These guidelines sew together the gaps left by surface parking by bringing buildings closer together and promoting walkability (one of the Plan's defining principles).

The Plan's strong Transit Circulator System combines rail, bus routes, and a new grid street design that encourages multi-modal and active transportation. Pedestrian and cycling infrastructure amenities will include highly visible cross walks, extending sidewalks, connector bridges, on-street bike parking, and bike lanes (sometimes shared with buses).³⁶ Bike and car sharing facilities are to be provided close to transit links. Onsite vehicles and preferential parking will be incorporated into the system. Additionally, a number of commuter incentives including subsidies for vanpooling and transit use, deduction of fares, car/vanpool matching, employee shuttles, showers, and secure lockers³⁷ will entice individuals to utilize the transportation network. A 50-50 public/private cost-sharing partnership is expected to fund this plan.

Parking is still required to address the current dearth of viable alternative transportation infrastructure. However, it is difficult to pinpoint the ideal interim levels of provision. As development increases and alternatives become increasingly feasible, the parking supply can decrease, and private developers will become increasingly responsible for their own parking provisions.

³⁶ Hangen Brustlin, Vanasse. 2008. *Wiehle Avenue/Reston Parkway: Station Access Management Plans – Final Report*. Available:

http://www.fairfaxcounty.gov/fcdot/pdf/wr_sam/sam_report.pdf

³⁷ Government of Fairfax County, Virginia. 2012. *Land Use – Transit Oriented Development. Tysons Comprehensive Plan*. Available:

<http://www.fairfaxcounty.gov/tysons/comprehensiveplan/landuse.htm>.

Balancing these commitments will prove to be a large challenge.

Another obstacle is securing long-term funding for the entire project. At the time of writing this report, administrators of the Silver Line's Phase Two development were still seeking full funding. This phase would establish a direct connection to Dulles International Airport, promoting inner-city mobility and connectivity for the entire greater Washington region.

Fairfax County has relied on the policies and practices propelled by neighbouring Arlington County to glean knowledge of how to effectively facilitate the transition from suburban vehicle dependency to alternative modes of transportation. Located 11km southeast of Tysons Corner, Arlington has pursued compact cluster development by honouring "Complete Street" principles. Pedestrians, cyclists, transit users, and automobile drivers alike have an equal share of the road through an easily navigable grid pattern and close proximity of transit stations.³⁸

Tysons Corner's proposed development demonstrates innovative techniques in remediating surface parking while fostering intensification, active transportation, and regional cohesion. It is still to be seen whether it becomes a success story or falls short of expectations, but Tysons is paradigmatic of how the mechanisms outlined in this report can be applied together and at a relatively large scale to fight the focus on the car, decrease urban sprawl, and increase density.

³⁸ Freemark, Yonah. 2011. *The Interdependence of Land Use and Transportation. The Transport Politic*. Available: <http://www.thetransportpolitic.com/2011/02/05/the-interdependence-of-land-use-and-transportation/>

Markham Centre – Moving from Surface to Structure



Rendering of Markham Centre

Markham Centre is an emerging downtown in the Greater Toronto Area. The City of Markham has been proactively working to encourage a transition from surface to structured parking in the downtown core, as well as promoting transit usage.

Through the implementation of policies that establish parking maximums, shared parking, priced parking, cash-in-lieu schemes, and Tax Increment Financing, the City of Markham is actively working to decrease the focus on the car, increase the density of development and promote transit usage in Markham Centre.

Richard Kendall of the City of Markham's Planning Department identifies the eminent challenge for the City's emerging downtown is the lack of feasible alternatives to the automobile. A developing transit system means parking demand remains high for new buildings. Combined with a veritable absence of critical mass and density of developments, this factor signifies that the economic conditions are not yet in place to support structured parking.

However, the City remains committed to reducing parking demand and Markham's shared parking policy identifies shared

parking possibilities among different structures by determining occupancy rates three times throughout the day (morning, afternoon and evening).³⁹ Instead of assuming new spaces are needed within a new build, existing sites can be put to full use, reducing the cost for the developer. The Ontario Ministry of Transportation encourages shared parking where possible, and similar shared parking standards are in place for the City of Toronto, Mississauga, Brampton, and Richmond Hill.⁴⁰

Markham Centre has also reduced the parking requirement for office uses by introducing parking maximums, which in some cases are lower than they were as minimums. City by-laws also require a significant portion of the required parking be accommodated within structures.⁴¹ This policy is challenged by the perceived lack of available parking, increased costs associated with providing parking structures and a lack of alternative access options. Therefore some variances have been granted in the short term to allow higher numbers of surface parking spaces to avoid losing investors to neighbouring municipalities. Ultimately as density increases (along with alternatives to car use) these surface parking lots can be redeveloped into new builds and parking structures.

³⁹ Ministry of Transportation, Ontario. 2011. *2.5.1 Parking Management Strategies*. Available: www.mto.gov.on.ca/english/transit/supportive-guideline/parking-management.shtml.

⁴⁰ Town of Richmond Hill. 2010. *Richmond Hill Parking Strategy - Final Draft Report*. Available: http://www.richmondhill.ca/documents/transportation_parking_strategy.pdf.

⁴¹ City of Markham. 2011. *Markham Centre Community Improvement Plan. For a sustainable, vibrant and distinctive, mix-use, transit-supportive downtown community* (Draft). Available: <http://www.markham.ca/markham/ccbs/indexfile/Agendas/2011/Development%20Services/pl110503/Economic%20Appendix%20G.pdf>.

The City of Markham has also built strong partnerships with downtown land owners. For example, the Remington Group and the City are working collaboratively to achieve a more active, dense and diverse downtown core, and not one dominated by surface parking. Randy Pedigrew, from the Remington Group, stated that they working with the City to reduce parking associated with their developments and confirmed the importance of increasing density, noting that this wasn't for Remington's bottom line, but for the increased efficiency of the area as a successful urban centre.



Paid Parking is enforced in Markham Centre, for example in public lots outside the Hilton Suites Hotel

The City of Markham is also thinking long term and responsible for managing 35% to 50% of the parking supply in the core.⁴² The City's Parking Strategy contemplates that the City could eventually control a significant enough component of the parking supply that it could influence, through a parking pricing policy, transit ridership behaviours. The provision of municipal parking facilities should help to level the playing field for attracting employment opportunities and encouraging the higher density development of employment lands in Markham Centre to help achieve the desired mix of uses.⁴³



Markham Centre is building high density structures that have high site coverage and positive relationships with surrounding streets

Overall, the City of Markham has adopted a practical, realistic, integrated, flexible and collaboratively approach to achieve its vision for a vibrant, prosperous and mixed use downtown core.

⁴² Maged Elmadoon. n.d. *Fact Sheet: Public Parking. Smart Moves London 2030 Transportation Master Plan*. Available: http://www.london.ca/Transportation_Planning/pdfs/SmartMovesFact_PublicParking_FINAL.pdf.

⁴³ City of Markham. 2011. *Markham Centre Community Improvement Plan, For a sustainable, vibrant and distinctive, mix-use, transit-supportive downtown community (Draft)*. Available: <http://www.markham.ca/markham/ccbs/indexfile/Agendas/2011/Development%20Services/pl110503/Economic%20Appendix%20G.pdf>.

Downtown Vancouver – A New Breed of Parking Challenges



View of Downtown Vancouver from SFU Harbour Centre

In established downtowns, land is valuable and scarce. The economic climate of these spaces generally supports the development of high density and integrated parking structures. However, there are many promising signs that established downtowns are able to go even further when it comes to reducing their parking supply, and in doing so, unlock additional development potential.

For example, City statistics show Vancouverites are increasingly choosing transportation alternatives to driving – more residents are relying on public transit, cycling, and walking. The number of people driving downtown has decreased every year for the last 15 years. These shifting travel patterns have created a plethora of empty and under-utilized parking spaces in the downtown core, about 7,000 empty spaces each day. The cumulative area of these parking stalls adds up to 10.5 hectares and equivalent to nearly 3% of land area in the downtown.⁴⁴

⁴⁴ Anderson, Graham. 2011. *New life for unused parking lots*. Vancouver Observer. Available: <http://www.vancouverobserver.com/city/2011/03/12/new-life-unused-parking-lots?page=0,0>.

The Canada Line (the rapid transit line opened in 2009 for the Olympic Games) has been cited as a major reason for declining car use in the downtown core. Since the opening of the line, the city-owned parking management company, EasyPark has seen a 20% drop in revenues.⁴⁵

Overall, downtown Vancouver is experiencing an increase in alternative modes of transportation. This allows for a growing number of workers and residents to be accommodated in the core, while maintaining or even slowly decreasing the current provision of car parking spaces. This case study also demonstrates the potentially powerful relationship between car parking provision and transit, where quality transit connections can dramatically reduce parking demand.



Vancity Centre, Vancouver

⁴⁵ Ibid

Conclusions

Surface parking lots have become a cultural norm in North American and a typical component of many new developments, particularly commercial developments in suburban settings. This supply of surface parking is compounding the outward expansion of many cities and leading to the rapid absorption of finite greenfield sites. As commercial development sprawls, the distances between home and work grows and accessibility lessens, creating traffic congestion at a regional level.

This outward growth also comes at the expense of emerging downtowns. These urban centres benefit from a greater access options than suburban office parks, high density residential development, as well as a diverse range of community facilities. Developing strategies to consolidate commercial development in these areas, will be crucial to their future strength and ability to emerge as vital, mixed use, pedestrian oriented communities.

In developing this report, the following key findings emerged:

Parking challenges cannot be viewed in isolation

The challenge of managing surface parking cannot be viewed in isolation. Rather, this challenge is inextricably linked to broader city building aims; intensifying commercial developments and reducing urban sprawl, building strong downtowns and urban centres, enhancing the public realm and providing the community with a range of mobility options. As a result, city builders will benefit from seeing this challenge holistically, working at various scales and with diverse stakeholders to adopt mutually reinforcing land use, transportation and parking strategies.

Parking strategies are synergistic and most powerful when implemented as a comprehensive package

Adopting a combination of strategies is critical as research revealed that strategies contained in this report have modest individual impacts, typically reducing parking requirements by 5-15%, but their impacts are powerful and synergistic when combined. It is for this reason that city builders must examine and implement a combination of strategies, as cumulatively these strategies can reduce the amount of parking required at a destination by 20-40%,⁴⁶ leading to all manner of economic, social and environmental benefits for urban centres.

Parking can be a strategic tool in city building

The municipality will benefit from investing in higher density parking in a multitude of ways, as they will unlock development potential by providing parking to support new developments, contribute to a more pedestrian oriented built form by minimizing surface parking and have a revenue generating asset into the future. In Calgary municipal control over parking availability has allowed the City to strengthen both its downtown and its transit system, by increasing the price of parking to encourage alternative modes of travel.

Public sector leadership is essential to achieve high density parking structures

Developers emphasized that presently the economic conditions are not in place to build underground or structured parking for office space in emerging downtowns or suburban office parks. Therefore, developers saw municipalities as needing to

⁴⁶ Litman, Todd. 2011. *Parking Management Strategies, Evaluation and Planning*, Victoria Transport Policy Institute. Available: http://www.vtpi.org/park_man.pdf.

be proactive and seizing opportunities for developing partnerships to realize higher density parking options.

Cities that were seeing the emergence of structured parking had all benefited from strong municipal leadership. These municipal governments had comprehensive programs in place to create the economic conditions necessary to support high density parking through either investments, subsidies or priced parking.

These efforts were largely occurring in the 'emerging downtown' context. Few examples of this leadership were found in an 'office park' context, yet there are signs this could be the focus of future efforts. As is the case with Tyson's Corner, cities will likely look at these office parks (particularly as more and more are depleted) to determine how they can transition from their uni-functional, low density format to grow into high density, diverse and sustainable economic regions.

Pricing parking is critical to financing mobility options – parking is not free

For many years, North Americans have come to expect 'free parking.' Yet, parking was never free and has always come at a cost. These costs are often hidden, but they are being covered in all manner of ways by developers, tenants and by employees. Due to this cultural expectation of 'free parking,' very few revenue generating options have been explored and even fewer implemented. However, this is a lost opportunity and charging for parking will be a critical step to starting to see the economic conditions necessary to be able to finance and realize high density parking options.

Reducing parking demand reduces the cost of building parking

By reducing the demand for parking, the costs of providing parking are reduced as less land area is required to support parking. TDM measures will therefore be a critical component of any parking strategy, to ensure costs are minimized. Yet, less demand for parking must be met by less supply. As discussed, UBC provides an excellent example of how momentum can build behind TDM programs and they can unlock development potential and lead to more pedestrian oriented build forms.

Regional cooperation is important to success

The effectiveness of many strategies can be hindered if regional cooperation does not occur. For example, as some members of the development community noted, if a municipality does not provide development friendly conditions they may look elsewhere. While municipalities need to support private investors, it is also important that on some key issues they hold firm to ensure that their city can thrive and contribute to a stronger, more efficient and less congested urban region. Across the GTA collaboration between municipalities will be critical.

New ways of thinking about parking

Overall, it is clear that the economic conditions simply do not support high density parking in the majority of commercial developments. Therefore, cities must adopt new and progressive ways to finance and develop high density parking to help facilitate office development and directly contribute to a pedestrian oriented urban form. Cities will see returns on these highly strategic investments, as new office developments will directly contribute to the bottom line, grow jobs and create a more attractive environment into the future.

Appendices



Appendix 1: The Actors

The landscape evolution of cities is immeasurably influenced by complex interactions between various actors. Many small actions taken by individuals or organizations can add up to major impacts in terms of the way cities are desired for social interaction and function. Understanding what drives each actor, how they influence city building and where interests intersect can help inform the development of a combination of meaningful strategies to achieve more compact urban forms. Overall, despite the benefits of pedestrian oriented development and the potential economic, social and environmental returns, this form of growth isn't the 'norm' across North America. It will be important that more integrated approaches and strategies are adopted to maximize benefits for all of these actors.

	Interest in Land Development Outcomes	Benefits to Achieving Pedestrian Oriented Development (POD)	Challenges to Achieving a POD
Municipality- M	<ul style="list-style-type: none"> Long term interest in land development, aim to achieve highest and best use of land. Committed to providing jobs, building a strong economic base and growing the tax base. Aim to achieve mixed-use development reducing the need to travel. Develop regulations and designate land uses. Concerned with environmental issues: urban sprawl, urban heat island, water quality, air quality, etc. Concerned with public health issues, aim to reduce air pollution, obesity, etc. 	<ul style="list-style-type: none"> Highest and best use of land, allows for intensification of development generating more property tax revenue. POD can grow profile and prestige of an urban centre Public health benefits from walking. Can be less land intensive and allow for expansion of ecological systems. POD creates more functional and aesthetically appealing communities. Essential for continued growth as greenfield sites will eventually be depleted. Moreover, retrofitting low density neighbourhoods, will likely be much more costly than adopting POD aims from outset. Maximize infrastructure investments, such as transit. 	<ul style="list-style-type: none"> Want to appear 'open for business' and provide opportunities for developers. In competition from neighbouring jurisdictions. Public transit is costly to build and operate. Community can be opposed to intensification and high density developments. Limited influence over individual development applications. Concerned when new developments do not provide 'enough' parking and/or meet parking provisions. Water, soil, air quality are rarely considered in economic term, so can create challenges for protecting ecological assets. Classification at the policy level can be difficult to identify.
Developer- D	<ul style="list-style-type: none"> Short or long term interest in land development, depending on economic conditions. Seek land with good economic returns. Understand marketability and are tuned into market forces, as aim to sell or lease their development/s as quickly as possible. Aim to maximize profits. Seek out locations with minimal development constraints to allow for straight forward approvals process and lower construction costs. 	<ul style="list-style-type: none"> More opportunity for generating profit by being able to build out an entire parcel, rather than providing surface parking. Transit is a major asset for new developments and can increase property values. Attractive and walkable areas are often sought after locations and could help increase marketability of new development. Working towards POD will likely generate a spirit of co-operation with municipality. 	<ul style="list-style-type: none"> Accustomed to providing surface parking for commercial developments on greenfield sites and have established business models. Respond to brokers/tenants who demand ample parking supply. Want certainty and are generally concerned with their individual development proposal. Developers follow municipal guidelines and parking requirements, which can allow for high parking rates and pay minimal attention to design qualities. Developers are not an autonomous group, a flexible approach is required when dealing with the development community.
Tenant- T	<ul style="list-style-type: none"> Short or long term interest in land development, depending on lease or purchase. Aim to locate in an area where they can prosper i.e. cluster with like businesses. Want access to quality infrastructure. Want access to quality prospective employees. 	<ul style="list-style-type: none"> Maximizes productivity of workforce by providing stimulation and choice. Increases prestige, and desirable work location to attract talented employees. Increases visibility and profile of office location. Tenants could save money by charging for parking or providing less parking. 	<ul style="list-style-type: none"> Tenants seek out ample parking for their employees and often provide free parking. Tenants like to be close to highway infrastructure to allow good access and increase visibility. Tenants aim to be close to like businesses, often clustered in low density business parks.
Employee- E	<ul style="list-style-type: none"> Short term commitment, dependent on employment. Living close to work to minimizes commute time and cost. Strive for work location that supports lifestyle. 	<ul style="list-style-type: none"> Employees like a stimulating work environment that enables walkability and undertaking errands during the work day. This is particularly true of the younger demographic, who are becoming and increasing portion of the labour force. Seek out desirable place to work. Can minimize commuting costs. 	<ul style="list-style-type: none"> Car culture exists and many commuters still prefer to drive. Public transit and active transportation does not serve many office developments. If it does, it often takes much longer to commute via transit than a personal vehicle. Few employers have comprehensive Transit Demand Management programs in place.

Appendix 2: The Scale and Urban Context

Cities are comprised of diverse neighbourhoods and development patterns. This research is concerned with four urban scales, the individual office building or cluster, the suburban office park, emerging downtowns and established downtowns. These urban contexts are described below and it is important to note that each urban context will respond to a different combination of best practise strategies.

	Icon	Characteristics	Image	Challenges to Achieve POD
Individual Office Building or Cluster	 <p>Individual Office Building/Cluster</p>	<p>These high density buildings are primarily accessible by automobile and have a large portion of their labour force commuting by car. This compounds the need for providing significant amounts of free car parking. Lower land prices make it more economical to provide this as surface parking rather than structured or underground parking.</p>	 <p>Individual Buildings or Cluster – High intensity building but only occupies a relatively small portion of the entire site.</p>	<ul style="list-style-type: none"> • Ample land available at relatively low cost, allows for swaths of surface parking. • Limited public and active modes of transit option. • Excellent highway access encourages personal vehicle use. • Employees are accustomed to free parking. • Buildings are often difficult to access on foot, site access designed for personal vehicles.
Suburban Office Parks and Edge Cities	 <p>Suburban Office Park</p>	<p>Suburban office parks are generally characterized by wide roads, excellent access to highway/s, minimal transit options, single land uses (no residential development) and increasing congestion issues. Edge Cities are characterized by having no determined or easily identifiable centre.</p>	 <p>Suburban Office Parks – Single use, land intensive with good highway access.</p>	<ul style="list-style-type: none"> • Few development constraints and ample land available at relatively low cost, allows for swaths of surface parking. • Limited public and active modes of transit option. • High levels of congestion on roadways. • Road network has been primarily designed for the movement of automobile with single use parks and minimal pedestrian infrastructure. • Lack of design guidelines generates sterile surroundings that offer few walkable destinations. • Lack of site planning, creates difficulties for future redevelopment or retrofitting.
Emerging Downtown	 <p>Emerging Downtowns</p>	<p>Emerging downtowns are generally characterized as the economic, cultural and social centre of their respective communities. Emerging downtowns often contain educational and cultural facilities, transit access, limited high density office, residential development and many large and relatively unconstrained development sites. Emerging downtowns are increasingly seeing parking being used as a strategic approach to city building.</p>	 <p>Emerging Downtown - Mississauga City Centre - Parking lots dramatically impact walkability.</p>	<ul style="list-style-type: none"> • Development constraints and limited land compel parking to be provided in structure. • Land prices and economic returns do not justify high density parking structures. • Surface parking lots meet current parking needs and therefore difficult to redevelop. • Nascent multi-modal and active transit infrastructure. • Battling with expectation of swaths of free parking.
Established Downtown	 <p>Established Downtowns</p>	<p>Established downtowns are characterized as the primary centre of economic, social and cultural activity in a much wider urban region; as well as providing high density office space, high density residential development and accessible transit services. Office development often does not include underground parking, yet this is compensated by a wide range of access options. Commuters are accustomed to paid parking.</p>	 <p>Established Downtown – Toronto Financial District – In this context land is too valuable to support surface parking lots.</p>	<ul style="list-style-type: none"> • High land prices, land and development constraints and long approval processes can create challenges for attracting new office development to an established downtown.

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Appendix 4: Images

Front Cover

- Top Left: <http://www.amgencorp.com>
- Top Centre: <http://www.s2ki.com/home/2010/10/20/parking-the-s2000>
- Top Right: <http://www.thestar.com>
- Middle Left: <http://www.pedbikeimages.org>
- Middle Centre: <http://www.albertaadventure.com/2010/07/parkade-paradise>
- Middle Right: <http://www.bharchitects.com/en/projects/96>
- Bottom Left: <http://www.urbanspacegallery.ca/exhibits/walkability>
- Bottom Centre: <http://www.pedbikeimages.org>
- Bottom Right: <http://www.via-architecture.com/projects-communityarchitecture>

Page 4

- Downtown Toronto's east end in the 1970s:
<http://www.blogto.com/upload/2011/10/20111011-Toronto-parking-lots-history.jpg>
- Downtown Toronto's east end today: Bing Maps

Page 5

- Mississauga Downtown 21 Master Plan renderings:
<http://www.skyscrapercity.com/showthread.php?t=441769&page=65>

Page 7

- Individual cluster of office buildings: <http://www.iona.edu/rockland/images/location.jpg>
- Suburban office parks: Google Earth
- Mississauga City Centre:
http://farm4.static.flickr.com/3527/3464286478_a11baf2a18.jpg
- Toronto's Financial District: http://www.economicsummits.info/wp-content/uploads/2010/06/Skyline_Toronto.jpg

Page 11

- Scarth Street, Regina: <http://media-cdn.tripadvisor.com/media/photo-s/01/17/8e/0c/regina.jpg>
- Pittsburgh LRT Extension:
<http://www.portauthority.org/paac/Portals/0/images/HiResMapNSC.jpg>

Page 13

- Shared parking aerial: http://www.mto.gov.on.ca/graphics/english/transit/supportive-guideline/2-5-2_1.jpg

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- Markham Centre construction: <http://www.flickr.com/photos/fotofrysk49/4282847413/>
 - Downtown Vancouver: http://www.openfile.ca/files/imagecache/blog_image/blog-assets/Vancouver/vancouver%20transporation%20plan.jpg

Page 14

- Downtown Vancouver scooter parking: <http://media.greenradio.topscms.com/images/42/07/5e3c273342a0984bf4faab2ddf1a.jpg>
- Stacked valet parking: <http://www.automatedparkinggarage.ca/>
- Sloped vegetation strips: http://www.streamteamok.net/Doc_link/Green%20Parking%20Lot%20Guide%20%28final%29.PDF

Page 15

- Jacksonville Diamond Building: <http://www.metrojacksonville.com/forum/index.php?topic=1058.0>
- Diagram of site planning for improved pedestrian access: Prepared by the CUI
- Santa Monica Civic Centre: http://farm4.static.flickr.com/3197/2954164239_313e4e0d46.jpg

Page 16

- Power Stream Vanpooling: <http://www.powerstream.ca/app/pages/Green-vanpool.jsp>
- Autoshare Program: <http://www.blogto.com/upload/2009/10/20091001-Autoshare-Car.jpg>
- Hatch Ltd's Commuter Incentives: http://www.smartcommute.ca/media/uploads/images/Hatch_photo_250x333.gif

Page 17

- C.K. Choi Building: <http://www.142.103.155.40/Portals/0/Images/CKChoiBuildingNorth.jpg>

Page 19

- Carlisle Garage, St. Catharines: <http://www.610cktb.com/Pics/News/Carlisle%20Garage.JPG>
- East End Parking Garage, Fredericton: <http://www.fredericton.ca/en/transportation/resources/EastEndParkingGarage-303.jpg>
- Celebration Square and City Hall Mississauga:
- <http://www.cip-icu.ca/greatplaces/fr/place.asp?id=5968>

Page 20

- Sydney aerial: http://www.australiaadventures.com/images/sydney_australia.jpg

Page 22

- Calgary transit: http://www.storage.canoe.ca/v1/dynamic_resize/sws_path/suns-prod-images/1297199412348_ORIGINAL.jpg?quality=80&size=650x

Page 23

- Saskatoon's "The Partnership" Streetscape Improvement: <https://www.ida-downtown.org/eweb/images/regina/regina-downtown-streetview.jpg>
- Real time parking map for San Francisco: <http://www.sfpark.org>

Page 24

- Aerial shot of Tysons Corner: http://www.americancity.org/images/daily/_resized/6045478465_517460b1f9.jpg

Page 27

- Proposed rendering of Markham Centre: <http://www.newurbanmom.com/wp-content/uploads/2007/09/markham-centre.jpg>

Page 28

- Hilton Suites Markham Centre: http://www.zkahlina.ca/eng/wp-content/uploads/2010/07/DSC_0431.jpg
- High density structures in Markham Centre: <http://www.jarrodarmstrong.com/images/11713/Markham-Condos/60-South-Town-Centre---markham-condos.jpg>

Page 29

- Downtown Vancouver from Simon Fraser University Harbour Centre: <http://www.vancouverobserver.com/city/2011/03/12/new-life-unused-parking-lots?page=0,0>
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