# TOWARD A LIVABLE REGION?

## AN EVALUATION OF BUSINESS PARKS IN GREATER VANCOUVER

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ABSTRACT

Postmodern metropolitan regions have become marked by the process of office suburbanization. Greater Vancouver has not been immune to this. Despite regional planning policy, suburban offices have located on industrial land in isolated, auto-dependent business parks. The amount of office space in business parks far surpasses office space in the designated regional town centres. This thesis examines whether business park development is consistent with the goals set out in Greater Vancouver's *Livable Region Strategic Plan;* whether business parks are in tune with the principles of sustainability; and whether business parks are fulfilling municipal tax and employment objectives. To answer these questions, an evaluative framework of eight criteria is established. Analysis of quantitative and qualitative data demonstrates that business parks are not consistent with these goals and objectives. The land consumed, the travel patterns produced, and the taxes generated by business parks reveal a land use pattern that is far less efficient than urban centre locations. Concentrating office development in existing urban and suburban centres complements the retail, residential, community services, and transit infrastructure in centres and enables employees to work in places where they can live, shop, and play nearby.

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Dad, from printing to proofreading to pinot noir, you've been there every step of the way. It is to you that I dedicate this thesis and all the cocktail-party statistics herein.

# 1 INTRODUCTION

Office employment in isolated, auto-dependent business parks is extensive in the Vancouver region and far surpasses office employment in suburban town centres. Locating stand-alone offices in business parks undermines regional planning goals and poses a significant threat to the livability of the region. Business parks are an inefficient use of land and heavily favour access by single occupant vehicles. The vast majority of business park employees drive to work because these locations are not within walking distance of places were people live, shop, or eat and are difficult and time consuming to access via public transit. This contributes to greenhouse gas emissions, air pollution, fossil fuel consumption, congestion and social inequity as people are forced to buy and maintain a car. Workers who must commute on transit have less personal time to be with their families and reduced flexibility.

Business parks, which are growing at a faster rate than urban centres, are an issue of critical concern as the region now grapples with rising rates of car-ownership, growing congestion, increasing levels of greenhouse gas emissions, and the public and private costs associated with these changes. Politically charged proposals for vast highway expansion are presented as the solution to regional transportation problems. However, highway investment will facilitate the further development of auto-dependent land uses, including business parks, further exacerbating congestion and urban sprawl.

## RESEARCH OBJECTIVES

This analysis of business parks in the Vancouver region addresses issues of land use, transportation, and social justice in the context of regional sustainability. This thesis is rooted in two primary objectives:

1. To document, describe and analyze existing business park development in the Vancouver region
2. To evaluate business parks against the principles of social and environmental sustainability, regional planning goals, and municipal economic objectives

The goal of this thesis is to provide insight into the impacts of business parks and the ways in which this form of land use helps or hinders planning goals and objectives. My hope is that our collective knowledge of how this form of land use affects individual travel patterns and the collective impacts therein will be expanded. This analysis is from a public, rather than a private, perspective; business parks are evaluated from a regional, municipal, and employee point of view. In this thesis I seek to answer the following questions:

1. Is business park development consistent with the regional planning goals set out in the *Livable Region Strategic Plan*?
2. Are business parks in tune with the principles of sustainability?
3. Are business parks fulfilling municipal economic objectives?

Under these three areas, regional goals, sustainability principles, and municipal objectives, eight criteria are set out in an evaluative framework. While social and environmental sustainability are explicitly addressed under “Sustainability Principles” the regional goals also embody principles of sustainability. Economic sustainability is implicitly considered under “Municipal Objectives” and is also a component of regional goals.

| | |
|---|---|
| Regional Planning Goals: | 1. Achieve a Compact Metropolitan Region<br>2. Increase Transportation Choice<br>3. Build Complete Communities<br>4. Protect the Green Zone |
| Sustainability Principles: | 5. Improve Environmental Integrity<br>6. Promote Social Equity |
| Municipal Objectives: | 7. Expand Commercial Tax Base<br>8. Provide Local Jobs for Local Residents |

More specific research questions are developed for each of the criterion, against which business parks are evaluated. This thesis demonstrates that business parks – as low-density single-use developments situated in isolated locations heavily favouring private vehicle access – do not further regional planning goals for a more livable region. In addition, business parks compromise sustainability goals and, finally, they hinder municipal planning objectives of using land efficiently to expand the municipal tax base and/or provide jobs for local residents.

## SUSTAINABILITY LENS

The principles of sustainable urban development provide the theoretical and philosophical framework for this research. Although the origins of sustainability are found in the disciplines of biology and ecology, the concept made its way into the planning and policy literature in the early 1970s and emerged as a significant theme in the 1980s (Beatley & Manning, 1997). In recent years the concepts of *sustainability* and *sustainable development* have been accorded political *cache* and attached to a diverse, and often contradictory, range of practices. Widely used and rarely defined, the value of the concept is at risk of being undermined if it can be manipulated to mean almost anything.

The most frequently referenced definition of sustainable development is from the 1987 document *Our Common Future* published by the UN Commission on Environment and Development. In this document, generally referred to as the Brundtland Report, sustainable development is defined as development that "meets the needs of the present without compromising the ability of future generations to meet their own

needs." While this definition opens a very large window of interpretation, sustainability is generally viewed as a concept framed by three pillars; sometimes called a three-legged stool, environmental, social, and economic principles are presented as the foundations of the concept of sustainability.

Recognizing the "interdependency of ecological, economic, social and governance systems" (Dorcey, 2002), sustainable planning practice is committed to "facilitating democratized processes of governance that sustain diverse, vigorous and equitable socio-economic systems while maintaining the stability and resiliency of ecological systems" (ibid). A sustainable urban region is one where residents enjoy a high quality of life, with equal access to employment, social interaction, safe and healthy food, recreation, education, and political empowerment; socio-economic disparities are limited and human consumption of natural resources and environmental degradation is minimized.

Peter Newman and Jeffrey Kenworthy emphasize the ecological component of sustainability in their book *Sustainability and Cities.* They define the goal of urban sustainability as "the reduction of the city's use of natural resources and production of wastes, while simultaneously improving its livability, so that it can better fit within the capacities of local, regional, and global ecosystems" (1999:7). The European Conference of Ministers of Transport articulate the challenge facing transportation and land use planners as the responsibility of "[a]ssuring that the growing numbers of urban and suburban dwellers in all socio-economic strata have access to the services and activities integral to their daily lives, while minimizing the negative environmental, equity, economic and health impacts of travel" (ECMT 2002:9).

I come to this research firmly grounded in the goal of furthering ecological sustainability and social and economic justice. It is through this lens of sustainability that I review the pattern of office development in the Vancouver region and evaluate the impacts of business parks. As a land use transportation planner, I aim to tackle the challenge put forth by the European Conference of Ministers of Transport and work towards Newman and Kenworthy's image of urban sustainability.

## METROPOLITAN RESTRUCTURING IN GREATER VANCOUVER

The structure of towns and cities has always been determined by transportation technology. Over the past 500 years the evolution in modes of transportation has yielded dramatic impacts on the structure of cities. When walking and horse-drawn carriages and carts were the primary forms of transportation, employment, markets, and services were clustered in locations close to where people lived, enabling them to access everything they needed on foot. Electric streetcars and trolleys were introduced to cities around the close of the 19th Century. In this era employment remained centralized and residential areas followed streetcar lines that ferried people between work and home. The widespread adoption of the automobile in the 1940s and 1950s, coupled with the radical expansion of roads and highways, dramatically changed the structure of urban regions. In the decades following the Second World War people began moving en masse to the edges of the city to live in newly built suburbs. This is commonly described as the first stage in the process of metropolitan suburbanization. With their customer base moving to the suburbs, commercial activities, particularly retail businesses, soon followed. Large regional malls and smaller strip malls were the product of this retail sprawl. This second stage of suburbanization was also characterized by the relocation of many manufacturing establishments to the suburbs.

The most recent stage in the evolution of sprawl and suburbanization is the geographical shifting of office employment to the suburbs. While residential and retail were moving to the suburbs, office functions remained fairly centralized until the 1970s; then the administrative, or "back office", functions of Central Business District firms began to be relocated to the suburbs. In the 1980s the pace of office decentralization accelerated as head offices began locating along highway corridors in suburban business parks (Cervero, 1989; Garreau, 1991; Coffey, 1994).

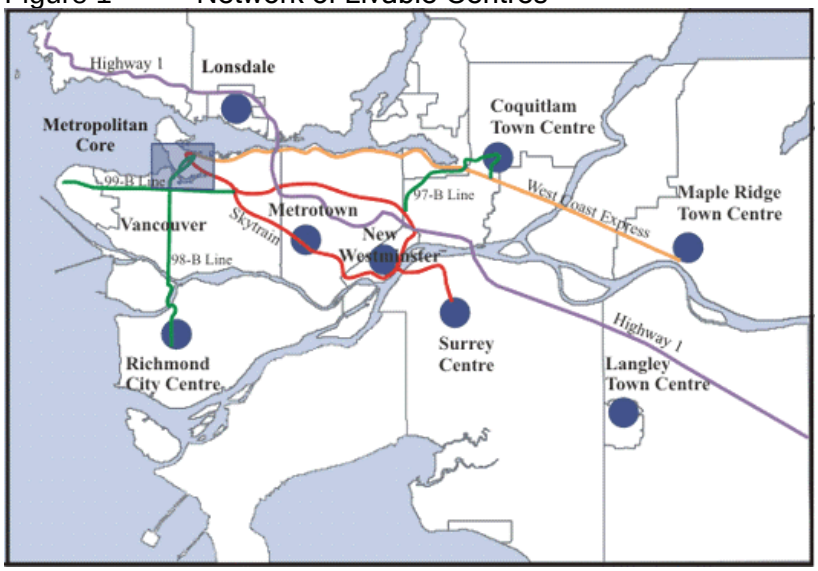
Joel Garreau (1991) captured people's attention when he addressed the manifestation of the third stage of suburbanization in *Edge City.* Noting the clustering of office and retail space in suburban centres, Garreau declared that "density is back" (1991:37). Robert Lang (2000, 2003) has also examined the pattern of suburban office development. Lang argues that while Edge Cities as medium and higher density office (with and without retail) clusters are one manifestation of the suburbanization of office

space, the majority of suburban office space is found in scattered low-density business parks. Lang contends that mundane yet ubiquitous office sprawl is the "unmarked phenomena of the new metropolis" (2003:5). Coining a "polite way of saying office sprawl" (2003:40), Lang has named his recent book, and this phenomenon, *Edgeless Cities*.

## VANCOUVER'S OFFICE MARKET

Vancouver's downtown core has always been, and continues to be, the primary location of office space in the region. The downtown office market is strong and continues to attract investment, but the proportion of regional office space in the metropolitan core is declining. The process of office suburbanization began in the Vancouver region in the mid 1970s (Gad & Mathew, 2000; Hutton & Davis, 1985); up until this point, regional office space was almost entirely centralized. Increasing the amount of office space in the suburbs has been regional planning policy since the 1960s, when the concept of a network of regional town centres was first envisioned. Recognizing that the metropolitan area would continue to expand, regional plans were set out to achieve a better balance between job and housing locations. The 1975 *Livable Region Plan* identified four centres: Metrotown in Burnaby, New Westminster's downtown, Coquitlam Town Centre, and Surrey City Centre. These were targeted to be significant employment centres, each with one million square feet of office space. This concentration of office employment in suburban centres was to be complemented by retail space, cultural and community amenities and medium and higher density housing. The vision was to create a network of transit-served, pedestrian-oriented, mixed-use centres where people could live, work, shop, and play without having to travel far to do so. This concept was further

Figure 1 Network of Livable Centres




Source: GVRD

developed in subsequent plans and policy documents and remains a core theme of the current regional plan, the *Livable Region Strategic Plan* (GVRD, 1996). This network of livable centres has now been expanded to include the Metropolitan core, eight regional town centres and thirteen smaller municipal town centres. The regional town centres and the connecting transportation network are represented in Figure 1.

In contrast to regional planning policy, suburban office development has not located in the regional town centres but has instead occurred in low-density business parks in isolated locations. In their analysis of floor space data from 1970-1979 Hutton and Davis note that "office suburbanization is occurring on a significant scale among the Vancouver suburbs" but offices were not locating in the regional town centres (1985:24). Today, sixty percent of office space in the region is in the metropolitan core, but only a small proportion of suburban office space is located in the regional town centres. Of the 12.8 million square feet of office space added to the region between 1990 and 2000, 6.7 million was added to business parks, 5.3 million to the metropolitan core, and less than 1 million was located in the designated regional town centres (Royal LePage, 2001). During this decade the amount of office space in business parks more than doubled, while the metropolitan core (defined as the downtown peninsula and central Broadway) and the suburban centres grew by approximately one quarter. With over 13 million square feet of office space, business parks accommodate more than three times the office space found in the eight regional town centres.

In comparison to many American cities that experienced a mass exodus of office space from the central business districts, the office market in the Vancouver region remains fairly centralized in the vibrant Metropolitan Core. However, the pattern of office suburbanization in the Vancouver region more closely resembles Robert Lang's Edgeless Cities than Joel Garreau's Edge City. As the data presented below demonstrate, the proliferation of office employment in isolated, auto-dependent business parks is extensive in the Vancouver region and far surpasses office growth in suburban centres. The accompanying analysis will discuss how this trend, which shows no signs of ebbing, undermines regional planning goals and regional sustainability.

As the office "industry" continues to define advanced capitalism, the location and form of office functions are a key determinant of metropolitan structure. Office space is more

densely inhabited than other commercial uses of business parks such as industrial or manufacturing, and thus has a greater impact on transportation patterns. The distribution of employment, and the corresponding access to employment, requires careful planning in order to ensure healthy patterns of metropolitan growth.

### Definition, Uses, and Origins of Business Parks

Business parks are low density developments on industrial land that permit stand-alone office buildings. Warehouse space, light industry, traditional manufacturing, high-tech manufacturing and biotech research can all be found in business parks. The focus of this research is the stand-alone office space in business parks that has no particular space requirements that could not be accommodated in a higher-density centre. One- to three-storey buildings, surface parking, large lots with substantial set-backs, and, in most cases, high landscape standards, are the key markers of business parks. A typical business park has a floor space ratio (FSR) of 0.3 to 0.5. Business parks are generally located off major arterial roads and highways with one or two entrances to a curvilinear street. Sidewalks, if there are any, are usually only on one side of the wide street.  Transit and pedestrian access to business parks is, at best, limited. Business parks have no centre and are disconnected from their neighbours.

Other terms for such developments include “office park,” “technology park,” “research park,” “executive park,” “R&D park,” even “science park.” These terms are not clearly differentiated and are often used interchangeably. Many of these developments include more than one type of activity. Some business parks are entirely office while others contain a mix of office, light industry, laboratories, and manufacturing. Aside from the odd coffee/sandwich shop, retail, restaurants, and residential uses are not found in business parks. What all these terms have in common, of course, is the moniker “park.” Used to explicitly distinguish from an urban environment, evoking the concept of park is a reference to the highly landscaped, campus-style settings that are often near amenities such as golf courses and greenways. The popular term “office park” could easily be substituted for “business park” in this thesis, but the latter term is used as it is the standard in the development and planning discourse in the Vancouver region.

As mentioned above, a diversity of work related activities can be found in business parks. These activities have special space requirements that are well suited to lower density, single use locations. Most biotechnology research and development facilities require laboratories and special ventilation. High-tech and traditional manufacturing activities demand production space, storage space, and the ability to handle goods movement with truck based highway access. In some cases, research and production may involve potentially volatile materials. Because of the nature of the work, these types of uses are not appropriate for higher density areas, immediately adjacent to where people live. In addition, organizations undertaking these types of activities generally have on-site office space that is accessory to the primary activities described above.

Stand-alone office space, another use found in business parks, is distinguished from office space that is ancillary to industry, manufacturing, warehouse or biotech research space. Stand-alone office space consists of typical office work (work stations, computers, meeting rooms) that has no special space requirements that necessitate a large floor plate building or physically separated location. These include head offices, back-office functions, and call centres. In this thesis, unless specified otherwise, office employment and office space refers only to office space in business parks that is not ancillary to industry or manufacturing. The office functions in these stand-alone office buildings could be accommodated in higher density and more central locations.

Business parks are often seen as suitable locations for high-tech sector employment. While some high-tech sector work involves manufacturing, much of the work in the high-tech sector, particularly software development and information technology, does not differ substantially from traditional office uses. About 70% of all high-tech jobs in Greater Vancouver are in the information technology sector. Office layouts and furniture are very similar to conventional offices. Their product is transmitted electronically, not manufactured and shipped by truck. Special requirements for advanced telecommunications technology such as LAN (local area network) and WAN (wide area network) connectivity, fibre-optics capability, built in wiring (and wireless) for internet and high-speed networks may have originally justified built-to-suit projects in business park locations. However, in the current business environment organizations of all types rely on these technologies to stay competitive and efficient. These features

are now standard in all new office buildings and the majority of older office buildings have been, or could be, retrofitted to provide state-of-the-art technology.

The earliest business parks in North America are now over 50 years old. In 1951-52, five miles outside of downtown Birmingham, Alabama, the Jackson Company developed the first business park, establishing the prototype. Named "Office Park" this 70-acre site had nineteen one-, two-, and three-storey buildings totaling 600,000 square feet of office space (McKeever, 1970). Surface parking adjacent to each building was "provided to meet tenant needs." (ibid:46) High quality landscaping and access to the park were touted as major attractions for tenants and their employees. According to McKeever's historical analysis, the concept of business parks first arose in the late 1940s as an "office-in-a-park" when a few large corporations began relocating their headquarters from central business districts to the suburban countryside. This started a landslide of office suburbanization as smaller firms followed the larger firms to the suburbs. Land developers realized a potential market in smaller firms who, unlike the large firms, could not afford to develop their own land and building but would appreciate the advantages of an "environmental setting."

By 1960 there were seven office parks underway in the USA; however, the majority of office parks in existence in 1970 were started after 1965 (ibid.). The rise of master-planned suburban office parks in the USA is inextricably linked to the 1956 US Federal Highway Act and the subsequent expansion of highway infrastructure. The new highways built under this act opened up vast expanses of undeveloped land outside of metropolitan areas (Cervero, 1986). Easy access to local freeways and major highways has always been a prime factor in selecting locations for office park development. In advertising for "Office Park", the Jackson Company boasted that there was "ample free parking" and "no tiring traffic tangles in the morning or evening rush hours" (McKeever, 1970:36).Transportation access was just as important to the first office parks developers as it is today.

## METHODOLOGY AND DATA SOURCES

This research focuses on the two suburban municipalities with the most office space, namely, the City of Burnaby and the City of Richmond. According to Colliers

International's inventory of office space in Greater Vancouver (First Quarter 2004), 44% of suburban office space is located in Burnaby and 22% in Richmond. Surrey accounts for 16% of suburban office space, the North Shore for 10% and 7% of suburban office space is in New Westminster. Business parks are found throughout the region, but the majority are concentrated in Burnaby and Richmond. Thus the research for this thesis was undertaken in two case study areas in these municipalities. Crestwood Corporate Centre is a business park in the Knight Street corridor in north Richmond. Glenlyon Business Park is located south of Marine Way in the Big Bend area of southern Burnaby.

A variety of data sources and research techniques were drawn upon in this analysis of business parks. Primary research, undertaken in partnership with the Greater Vancouver Regional District (GVRD), consisted of interviews and site analysis. Qualitative research, in the form of short, semi-structured interviews, was conducted with employees working in the Big Bend area of Burnaby (south of Marine Way) and the Crestwood area of Richmond (along the Knight Street corridor). Employees working in these areas were approached on the bus, at bus stops, in the parking lot, walking around the site, eating lunch at picnic tables and enjoying a smoke break outside office buildings. Potential respondents were provided with a card outlining the study, assured of their right to anonymity, and given contact details for more information (Appendix A). A structured questionnaire was developed (Appendix B), however in the field it was clear that a more effective approach was to engage in a conversation with the respondents, asking them as many of the prepared questions as time permitted. Asking sensitive demographic questions, particularly regarding income, was not appropriate given the context and nature of the interviews. Respondents were asked about their commuting behaviour (mode, distance, time, route), where and when they do daily errands and eat lunch, their perspective on their location of work (likes/dislikes, in comparison to previous work location and to a town centre), and their perception of barriers to using another mode of travel.

The sample was not randomly selected; the aim was to solicit a range of experiences from the employees working in and commuting to jobs in this form of land use. A total of thirty business park employees were interviewed; fifteen in each of Richmond and Burnaby. An equal number of men and women participated in the study. Only one

person refused to be interviewed and a second person was excluded due to a language barrier. Conducting the interviews at lunch time on nice summer days, when people were outside enjoying the weather on a break, greatly facilitated the research. Such a high level of participation would have been more difficult under other circumstances.

In a separate data collection effort, expert interviews were conducted with municipal planners from Burnaby and Richmond, real estate analysts and brokers, developers, and managers of firms located in business parks. These interviews were held in person and via telephone.

Site analysis of business parks are an additional form of primary research. Publicly available information on the site size, square footage, property assessments, taxes levied, and parking provided for buildings in business parks was collected from the municipalities (via their websites, phone systems, or provided directly), and from the BC Assessment Authority. Detailed site analysis for all business parks in the region lies outside the scope of this research. For explanatory purposes, analysis was conducted on a selected sample of business parks in Richmond and Burnaby. Business parks in these municipalities were selected to represent the development trend in terms of size, style, and location.

This primary research is supported by academic literature and professional reports. This thesis relies heavily upon specially commissioned research on the Vancouver office market conducted for the GVRD by Royal LePage Advisors Inc, one of the primary commercial real estate services companies in the Vancouver region. The findings of this research are publicly available. The Policy and Planning Department at the GVRD made available special analysis by Statistics Canada of 1991, 1996, and 2001 Census data.

## THESIS OUTLINE

This introductory chapter is followed by a discussion of the North American experience of metropolitan restructuring and office suburbanization in the post-war period. Collective knowledge on the relationship between land use, urban form, and travel behaviour is reviewed in this chapter. Chapter three reviews the planning context and

office location trends in the Vancouver region. The unique nature of the region's governance structure is reviewed. Current regional planning policy of regional town centres and office development is presented. Trends in office location, local examples, the private sector rationale and municipal policy towards business parks are also discussed. Business parks are evaluated against eight planning criteria; the framework for this evaluation is laid out in chapter four. Drawing on a range of data, the penultimate chapter evaluates business parks against sustainability principles, regional planning goals and municipal planning objectives. Chapter six synthesizes the findings of the previous chapters in the context of the implications for regional sustainability and concludes with possible policy responses and directions for future research.

# 2 BROADER CONTEXT

## METROPOLITAN RESTRUCTURING

The world began to change substantially in the first decades of the 18th Century with technological advances that brought the steam engine and the cotton jenny into existence. The Industrial Revolution, which lasted some 200 years, brought about dramatic change on the landscape of nations that had been largely agricultural. Cities grew dramatically as agrarian populations moved to metropolitan areas in search of employment. The industrial metropolis was fuelled by the advent of capitalism and the economic restructuring in favour of factory production (Coffey, 1994). These cities were dense and dirty, plagued with poor air quality and unsanitary conditions.

Social historian Eric Hobsbawm (1994) marks the end of the 19th Century with the start of the First World War, as the industrial era began to give way to modernism. Urban geographers and historians see the roots of significant metropolitan restructuring in the 1920s and 1930s, but mark the birth of the modern metropolis at the end of the Second World War (Coffey, 1994). The modern metropolis is distinguished geographically from the industrial metropolis. Cities were functionally reorganized as an increasing proportion of the population and commercial and manufacturing activities located in the suburbs rather than in the central city (Coffey, 1994). Like the industrial city, the economic base of the modern metropolis was based on industry and manufacturing.

While the industrial city lasted two centuries, the heyday of the modern metropolis was interrupted after roughly two decades. David Harvey (1989) marks 1973 as the beginning of the transition to postmodernism. The worldwide economic crisis of the 1970s and 1980s produced a profound shift in the dynamics of modern urban and national economies. Service provision has replaced goods production as the principal form of economic activity. In the 1970s the so-called 'office industry', as the "administrative, management and control functions of an advanced economy," surpassed the manufacturing sector in terms of employment (Jenkens, 1996:1). The manufacturing share of Canadian employment has fallen from 27% in 1961 to only 15% in 1992. In contrast, over 72% of employment in Canada is in the service industry (Filion and Rutherford, 2000). Coffey (1994) has dubbed this economic restructuring the "Non-Industrial Revolution". The relative shift of activity away from manufacturing and goods production in favour of services and knowledge production led to the formation of the postmodern metropolis[1] (Coffey, 1994).

Although some are apt to suggest we live in an era of "post-industrialism" (Jenkens, 1996; see also Bell, 1973) the shift in the economies of developed worlds should not be understood as a general process of deindustrialization. Two forms of restructuring created an illusion of deindustrialization. First, productivity increased as industry and manufacturing processes became increasingly automated. Industrial employment decreased while production levels were maintained or even increased. Second, industrial activities relocated to developing countries where the labour markets were cheaper. Cities in developed countries took on the activities that are "upstream (e.g., design, research and development) and downstream (e.g., marketing, advertising)" of goods production (Coffey, 1994:11).

### OFFICE SUBURBANIZATION

One of the spatial characteristics of the post modern city is the suburbanization of higher-order office functions (Coffey, 1994). Following the move to the suburbs of residential and retail space, office space began leaving cities in noticeable numbers in the 1970s. The economic restructuring in favour of office-based employment in the

[1] Some have referenced this shift as a transition from Fordist to post-Fordist systems of production and labour market structure (see Filion and Rutherford, 2001; Rutherford, 1996)

United States caused the supply of office space to double between 1959 and 1979 and to nearly double again between 1980 and 1990 (Pivo, 1990). It is likely more accurate to describe the pattern not as offices leaving the central cities but as new offices never locating there in the first place.

This change in the landscape of office employment attracted the attention of a few writers in the 1970s (Daniels 1979; McKeever 1970; see Lang 2003:6 for list of *New York Times* articles). However, it wasn't until the late 1980s and early 1990s that the academic community began to understand the importance of this trend in the spatial distribution of office employment. A number of books and articles on the topic were published in the space of about five years (Cervero 1986, 1989; Garreau 1991; Fishman 1987, 1990; Leinberger 1988, 1990; Leinberger & Lockwood 1986; Pivo 1990).

Although a number of authors recognized office decentralization as a key part of the suburbanization process, there has been remarkably little research on this phenomenon (Jenkens, 1996). In her review of the office location literature, Jenkens attributes the paucity of research in the area to severe data limitations, the relatively recent recognition of importance of the office industry, and the lack of a unifying body of theory available to guide research. The shift in the economic base of cities in the 1970s, as discussed above, did provide some impetus for literature on office location. Prior to the 1970s there had been only a few, scattered publications (see New York Regional Plan studies of 1927, 1959, 1960; Hoover and Vernon, 1959; Robbins and Terleckyj, 1960). In 1979 Daniels published an edited collection of fourteen papers on office location in Britain and the United States in a volume entitled *Spatial Patterns of Office Growth and Location.*

In 1996 Jenkens argued that a limitation of the office location literature was the tendency to understand office location only in dichotomous terms: central versus dispersed, high order versus low order, and central business district versus suburban. In one of the more frequently cited pieces of research on office location, Gary Pivo (1990) resisted the temptation of dichotomy and developed his "net of mixed beads" theory. Through longitudinal case studies of five American cities and one Canadian city, Pivo tested four descriptive theories of office suburbanization and concluded that

> [a] more complex pattern is evolving in which the majority of office space is located outside the regional CBD, with some scattered away from freeways, but most located in a large number of small and moderate-sized, low intensity clusters along freeway corridors (Pivo, 1990: 457).

Readers must be careful not to misunderstand the picture Pivo paints of clusters. His definition of a cluster is "two or more office buildings separated by one-quarter mile or less" (ibid., 460). The median cluster size in Pivo's six study regions ranged from 219,000 to 525,000 square feet of office space. The median intensity (or density) of the clusters in each region ranged from 1,900 square feet per acre to 7,900 square feet per acre (this is measured as the total gross floor area of buildings by acreage of land within a polygon defined by the outermost buildings in the cluster). This contrasts to the CBDs in the regions which contained between 25 and 47 million square feet of office space, ranging upwards from 25,000 square feet per acre. The term cluster, which implies concentration, may not have been the most appropriate label for a few small office buildings that happened to be located next to each other along the same highway.

In each region Pivo studied the CBD's share of regional office space declined from 1960 to 1988, although the period of the most rapid decline occurred at different times in each region. It is notable that in Toronto, the only Canadian city in the study, the CBD retained the highest share of regional office space. While there was a large range in the total number of clusters in each region (33 to 273), Pivo documented that the pace of increase in the number of clusters was fairly even.

The concept of a "net of mixed beads" comes from Pivo's finding that the pattern of suburban office clustering is not even. The net consists of one or two very large clusters (approx 10-20 million square feet), an increasing share of medium clusters (approx 1-3 million square feet) and a large number of smaller clusters (approx ½ million square feet). In every region there was a one large "primate" cluster in 1988 that contained from 10%-36% of the non-CBD office stock and was two to four times as large as the next largest cluster. These largest clusters ranged in size from 9 million square feet to 23 million, approaching in size, but not intensity, of the traditional CBDs.

Pivo's definition of a cluster as "two or more buildings within one-quarter mile" was apparently chosen so the cluster concept would describe a pedestrian-oriented unit of analysis. However, he provides no evidence that these clusters, which tend to be located along freeways, are conducive to pedestrian access. In fact, given the median size and density of the clusters, the large number of smaller clusters, and the proximity of the clusters to freeways, it seems that Pivo's quantitative analysis picked up a proliferation of business parks in the study regions. Using different language, the pattern of metropolitan office space that Pivo's research has stumbled upon can be described as: Suburban office space, which has surpassed the CBD, is found in one or two large "suburban downtowns", several smaller medium size agglomerations, all surrounded by a sea of office parks.

The October 1986 cover story of the *Atlantic Monthly* (a widely circulating American newsmagazine) was entitled "How Business is Reshaping America". This article written by Christopher Leinberger and Charles Lockwood discussed the "rapid growth of office space in the suburbs," the "dramatic restructuring of America's cities and suburbs" and the emergence of "urban villages" (1986:43). The authors described these urban villages, located in the suburbs, as "business, retail, housing, and entertainment focal points amid a low-density cityscape" (ibid).

Published five years after the Leinberger and Lockwood article in the *Atlantic Monthly,* and likely the most well known examination of the suburbanization of office space, is Joel Garreau's 1991 book *Edge City.* Written for a popular audience, *Edge City* documents the "new city centres" that are tied together by "jetways, freeways, and rooftop satellite dishes". Edge cities, primarily office employment and retail centres, are a product of the third wave of suburbanization. Using essentially the same definition for what Leinberger and Lockwood (1986) called "urban villages," Garreau coined the term "edge city" for any place that:

- *Has five million square feet or more of leasable office space*
- *Has 600,000 square feet or more of leasable retail space*
- *Has more jobs than bedrooms*
- *Is perceived by the population as one place*
- *Was nothing like "city" as recently as thirty years ago* (1991:6-7)

The emphasis is on office space because office space is the industry of advanced capitalism. Garreau suggests that edge cities are the manifestation of the postmodern economy. Now capturing more office space than traditional downtowns, edge cities are presented as the suburban future. They are also, in Garreau's perspective, the manifestation of American values. They are "the culmination of a generation of individual American value decisions about the best ways to live, work, and play – about how to create 'home'" (1991:7).

*Edge City* is less a systematic accounting and analysis of these new suburban downtowns, than it is a commentary on suburbanization. Garreau romantizes these suburban centres, invoking powerful images of American pioneers; the subtitle of the book is "Life on the New Frontier." Edge Cities are idealized as havens from the controlling and oppressive traditional urban environment. "It's possible that edge city is the most purposeful attempt Americans have made since the days of the Founding Fathers to try to create something like a new Eden" (Garreau, 1991:14). Yet in the same breath Garreau states that in the "unsettled, unsettling environment of edge city, great wealth may be acquired, but without a sense that the place has community, or even a center, much less a soul"(ibid).

Leinberger and Lockwood (1986) and Garreau (1991) both argued that these higher density suburban centres represented the 'suburbs grown up'. It was almost as if these authors were predicting the 'death of sprawl' by declaring that "density is back" (Garreau, 1991:37). Noting the high-rise office buildings, the hotels, the sophisticated shopping and even higher-density housing Leinberger and Lockwood claimed that low-density suburban sprawl was merely a stop on the way to urbanism:

> Now it appears that the much-reviled postwar suburban sprawl, with its sea of split-level houses surrounding retail businesses and apartment complexes strung randomly along its highways, was merely a transitional phase between the traditional compact pre-war city and today's metropolitan area. (Leinberger and Lockwood, 1986:43)

While there is little doubt that office functions have been decentralized from the CBD to the suburbs, there is divergence on the form of this decentralization. Robert E. Lang also sees office space as an important indicator of metropolitan change. Lang's data concurs with Garreau's assertion that the majority of office space is now found in the suburbs but Lang diverges substantially in his analysis of how this trend has been

realized in the built environment. Framed as a response to *Edge City*, Lang has developed the typology of "Edgeless Cities". In *Edgeless Cities* (2003), Lang defines this concept as "a form of sprawling office development that does not have the density or cohesiveness of edge cities" (ibid.:1) Edgeless cities are "not mixed-use, pedestrian-friendly areas, nor are they easily accessed by public transit" (ibid.). Coining the term as "a polite way of saying 'office sprawl'" (ibid.:40), Lang uses the term "edgeless cities" because, he argues, that most suburban office areas lack a physical edge or well-defined boundary. They are not unified and have no sense of place.

> Edgeless cities thus are cities in *function*, in that they contain office employment, but not in *form*, because they are scattered, unlike traditional and even some suburban office development. (2003:2; italics original)

While Lang makes a convincing argument, his use of the term "edgeless cities" may not be the most appropriate. From an airplane it is true that low density office sprawl is scattered throughout a metropolitan region and it would not be possible to draw a circle around it on a map; but on the ground the edges seem very clear. The business parks that make up these edgeless cities are bounded by highways; they are disconnected, segregated, and isolated. One or two entrances off a major road are the only access points. There is no integration between office parks and areas of other uses.

Similarly, I am not convinced that they are cities even in function – for a city is defined by much more than office employment. In 1937 Lewis Mumford asked the question 'What is a City?':

> The city in its complete sense, then, is a geographic plexus, an economic organization, an institutional process, a theater of social action, and an aesthetic symbol of collective unity. It is in the city, the city as theater, that man's more purposive activities are focused, and work out, through conflicting and cooperation personalities, events, groups, into more significant culminations (Mumford 1937 published in LeGates and Stout, 2000:94).

Mumford was hardly describing the edgeless cities that Lang is presenting.

The debate about nomenclature aside, Lang makes an important contribution to our understanding of office suburbanization. Lang argues that "edgeless cities are the unmarked phenomena of the new metropolis. They are mundane, they are ubiquitous, and most people intuitively know what they are" (Lang, 2003:5). They might not be as

dramatic or notable as edge cities, but Lang's research[2] of major American metropolitan areas reveals that edgeless cities account for two-thirds of the office space outside of traditional downtowns (ibid:1). Despite the claims made by Garreau and Leinberger and Lockwood, the face of suburbia is not found in 'edge cities' or 'urban villages'. Office sprawl is a major characteristic of suburban development, and it is almost always overlooked. Density is not back; "the long-standing presence of 'edgeless cities' means that sprawl is back – or, more accurately, that it never went away" (ibid). Lang also explicitly disagrees with Leinberger and Lockwood and Garreau that office sprawl will eventually 'grow up'; "edgeless cities are not edge cities waiting to happen" (ibid:11).

At about the same time as Leinberger and Lockwood, Lang, Garreau, Pivo and Cervero (discussed below) were writing about office suburbanization in American cities (Pivo did include Toronto in his study) Malcolm Matthew (1992, 1993) and Gunter Gad (1979, 1991) were writing about the phenomenon in the Canadian context. In his study of office location by industry type, Gad (1991) reported that, in the Toronto region, about 45% of office jobs were in the CBD and 55% were in the suburbs. The CBD/suburb split expressed in terms of office floor space showed a slightly higher split in favour of the CBD because floor space surveys exclude buildings less than 20,000 square feet and office space attached to plants. Gad's study (1991) focuses on Toronto but he did briefly review office location in seven other Canadian cities; Toronto had the highest degree of decentralization. Mathew (1992, 1993) pointed out that, in comparison to American cities, the CBDs in Canadian cities have remained strong office magnets, to such an extent that municipal governments in Toronto and Vancouver encouraged decentralization in the 1970s and 1980s. By the early 1990s exceptional highway access and telecommunications advances were enabling a wide range of office activities, including corporate head offices, to locate in the Toronto suburbs (Mathew, 1993). While Mathew's study was on Toronto he suggested that decentralization of head offices in Vancouver would be promoted by rising costs in the CBD.

In 1986 transportation planner and researcher Robert Cervero published *Suburban Gridlock,* his analysis of the transportation patterns that are produced by office suburbanization. The flight of offices to the suburbs means that the dominant commute

[2] The data for Lang's analysis is from Black's Guide to Office Leasing, a national directory of office space in the United States listing multitenanted rental office buildings of 15,000 square feet or more.

pattern no longer resembles “radial spokes of a wheel focused on a downtown hub” (Cervero, 1986:9). The increase in inter suburban travel coupled with the decrease in average household size and greater reliance on private vehicles produced suburban traffic congestion. This assertion was supported through the in-depth analysis of the 1960, 1970, and 1980 US Census journey to work data by Alan Pisarski (1987).

The researchers discussed above largely studied the spatial distribution of office space at a regional scale. In contrast, Cervero focused on the physical layout and land use composition of outlying office developments. It is not so much that office jobs are locating in the suburbs; it is the physical makeup of suburban office sites that impact mobility. Cervero identified that there were three basic types of suburban office developments: (1) campus-style office and business parks; (2) speculative, freestanding, independent office structures; and (3) clustered towers and ‘urban villages’ (1986:43).

All three types of developments had employment and land use densities far below CBDs. In Cervero’s national survey of office space in 1984 the Floor Space Ratios of suburban office developments were, on average, 1/25$^{th}$ lower than the FSRs in the CBD. In addition, downtown offices accommodated about one employee for every 175 to 200 square feet; in the suburbs there was about 380 square feet per office worker. Density has a critical impact on mode choice and “reasonably dense clusters of suburban employees are essential if public transit, private commuter buses, and carpools are to assemble trips without excessive route deviations and time delays” (ibid.:49). Cervero is unequivocal in his assessment on how the densities and form of suburban office development impacts travel:

> Most contemporary suburban office developments, for all intents and purposes, are effectively preordained for automobile usage. Particularly in the case of sprawling office parks where liberally spaced, horizontally scaled buildings dominate the landscape, the private automobile faces no serious competition to speak of. In that virtually any movement between buildings must be made by car, most employees find few realistic alternatives to driving their own vehicles to work (ibid.:50-51)

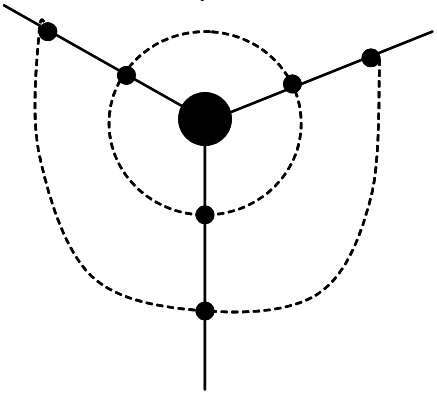
Cervero followed up *Suburban Gridlock* in 1989 by publishing *America’s Suburban Centers* which documented his research on land use, employment, and travel data for over 50 large American suburban employment centers. One of Cervero’s primary purposes in this book was to test his basic hypothesis that

> the *low-density*, *single-use*, and *non-integrated* character of suburban employment centers have compelled many workers to rely upon their automobiles for accessing work and circulating within projects (1989:3, emphasis original).

Using stepwise regression analysis, Cervero's dependent variable was the percent of work trips made by single occupancy vehicle. Various site, land use, density characteristics, and alternative transportation options variables were included as independent variables. In this study, of all the site variables examined, it was land use mix that had the greatest influence on mode choice. The higher the percentage of total floorspace occupied by office uses the greater the proportion of commute trips were by single-occupant drivers. Mixed-use centers with on-site and nearby retail services induced work trips that were made by ridesharing, walking, and cycling. Higher density locations were also associated with a lower mode split for single occupancy vehicles, likely because of lower parking levels. Higher density areas also had worse congestion on connecting freeways and arterials.

The jobs/housing balance was also factored into Cervero's analysis. Measured as the ratio of on-site employees to estimated housing units within a three mile radius, this analysis revealed that "suburban work settings with a more even balance of jobs and housing tend to have higher shares of employees walking and cycling to work" (Cervero, 1989:165). At the same time, a more even jobs/housing balance was associated with a lower percentage of carpooling and vanpooling. Cervero theorized that ridesharing is not attractive for short distances because the time spent picking up/dropping off other passengers is too onerous.

Figure 2 Adaptive Cities Model



In *The Transit Metropolis* Cervero (1998) develops a typology of metropolitan regions where "transit and the built environment harmoniously co-exist, reinforcing and enhancing each other in the process". Adaptive Cities, one of Cervero's four classes and exampled by Stockholm, Copenhagen, Tokyo, and Singapore, are polycentric cities. These metropolises are characterized by strong CBDs and rail systems with compact mixed-

use suburban communities concentrated at nodes along the transit lines. Figure 2 is based on a graphic Cervero uses to portray the relationship between urban form and regional transit services in adaptive cities. Vancouver, an aspiring transit metropolis according to Cervero, falls within the Adaptive Cities tradition.

## LAND USE, URBAN FORM AND TRAVEL BEHAVIOUR

Cervero's work on how suburban office development impacts travel behaviour straddles two important bodies of literature. The first, the office suburbanization literature, has been reviewed above. Cervero is also an important and longstanding contributor to the broader land use-transportation literature. This wide body of research examines the land use-transportation connection generally and, specifically, how land use and the built environment impact travel choice and behaviour (see literature reviews by Badoe and Miller, 2000; Ewing and Cervero, 2001; Handy, 2002; Steiner, 1995 and recent publications by Boarnet & Crane, 2001a, 2001b; Crane, 2000; Cervero, 1989, 2002, 2003; Cooper et al, 2002; Dieleman et al, 2002; Forkenbrock, 2002; Frank, 2000; Greenwald, 2003; Krizek, 2003; Srinivasan & Ferreira, 2002). However, the majority of research in this area focuses on land use and the built environment at the home location (Crane, 2000). Although different researchers have explored the relationship between travel and built environment from a variety of angles, using a range of measures, the essential question has largely been 'how does where a person lives impact their travel patterns'. Almost a decade ago Frank and Pivo (1995) demonstrated that urban form at both the trip origin and destination impacts mode choice.

Recognizing that a significant gap in the literature was how the size, density, and land use of suburban office and commercial centres impact employee travel patterns Cervero (2002) attempted to mitigate this shortcoming in a paper on the built environment and mode choice. His study of Montgomery County, Maryland focused on the influence of built environments at both the trip origin and destination on commute trips. Using measures of density, diversity, and design, Cervero modeled the predictive capability of these independent variables on the probability of solo-commuting. Not surprisingly, the inclusion of the accessibility variable demonstrated that commuting from an origin with good highway access to a destination with good highway access

increased the likelihood of solo-commuting. The prevalence of mixed-use settings at the origin and destination decreased the odds of driving alone and increased the likelihood of taking transit, but the relationship was stronger for the workplace destination. Employees are less likely to drive alone when there is easy access to shops, services, and other activities near to their place of work. Cervero found that in contrast to single-use office parks, mixed-use workplaces enable non-solo-commuting (2002:273).

Activity density, expressed as the total of population and employment divided by total square miles of the traffic analysis zone, at both the trip origin and destination significantly increased the odds of taking transit. Cervero's measure of pedestrian connectivity, the ratio of sidewalk miles to road miles, also influenced mode choice, although to a weaker degree than the impact of density and land use mix. Since a transit trip is almost always paired with a walk trip, complete sidewalk networks at the trip destination promoted transit usage. [3] Another finding relevant to this paper is that the prevalence of multi-family housing, a measure of transit-oriented development, lowered the odds of driving alone relative to transit riding.

That density is a fundamental factor in determining travel behaviour has been well established by a number of authors (Pushkarev and Zupan, 1977; Newman and Kenworthy, 1989, 1999; Cervero, 1986, 1989, 1999; Frank and Pivo, 1995). Studies that incorporate measures of employment density provide insight, either directly or indirectly, into how land use at the work place impacts travel patterns. Employment density is generally measured as the number of jobs or employees within a designated geographic area or within a designated commute time. Looking at work trips, Frank and Pivo (1995) found that employment density, population density, and land-use mix were negatively related to single occupancy vehicle usage and positively related to transit and walking. According to their analysis, there is a dramatic increase in the proportion of transit trips that occur when employment density surpasses more than seventy-five employees per acre.

[3] The prevalence of sidewalks is an important component of measuring walkability, however this measure fails to account for connectivity. All of the roads might have sidewalks but the blocks might be too large and the route too circuitous to really support walking. Intersection density, the number of intersections per square kilometer, has been used by Frank et al (2005) as a measure of connectivity. Other measures to include are distance to transit stop and the presence of cross-walks.

Newman and Kenworthy (1989) have also demonstrated that both residential and employment density are negatively related to private vehicle use and positively related to public transit use and walking/cycling.

> In other words, higher population and job densities in all parts of the city are significantly associated with more public transport, greater public transport service provision per person, more annual trips per person and a higher proportion of workers using public transport. Similarly, higher densities are in each case associated with a greater proportion of people using foot and bicycle to get to work. (Newman & Kenworthy, 1989:50).

The authors emphasized the importance of having higher residential densities mixed in with employment activity in order for there to be much less dependence on private cars. Employment centres that are proximate to high residential densities have a significantly higher proportion of people walking.

In their analysis of how urban design and urban form characteristics impact personal travel choices, Douglas and Evans (1997) examined employee travel behaviour in four different employment locations in the Washington, D.C. area. The commute to work and daytime travel choices were examined for employees working in the downtown Central Business District (CBD), a suburban CBD, a suburban office campus, and a suburban office/research park. Their findings revealed "dramatic differences in the travel patterns of employees with similar jobs and incomes depending on the urban character of the work place (including mix of land uses)" (Douglas & Evans, 1997: 298). The journey to work mode split data is presented in Table 1. Only 3% of employees in the low-density, single use suburban office campus/park settings take transit to work and almost no one walks to work. In contrast, in the suburban centre, a mixed-use node focused around a subway station, 18% of employees use an alternative mode of transportation to get to work. In the downtown CBD, just over a third of employees drive to work; 64% get to work via a mode other than private automobile.

Table 1 Washington DC Area Journey to Work Mode Shares

| | Private Vehicle Driver/Passenger | Transit | Walk | Other |
|---|---|---|---|---|
| CBD | 36.1% | 57.5% | 3.9% | 2.5% |
| Suburban Centre | 82.0% | 14.1% | 2.7% | 1.2% |
| Office Campus | 97.1% | 2.7% | 0.2% | 0.0% |
| Office Park | 96.1% | 2.7% | 0.2% | 1.0% |

Source: Douglas & Evans, 1997

Douglas and Evans also examined the mid-day travel behaviour of the employees in their four study locations. Their data revealed that employees working downtown make substantial more mid-day trips than do people working in the suburban office/research park, but 80% of these are walk trips. In the suburban campus/park locations 90% of the mid-day trips were by private car. In their words, “employees in the suburban office/research park generate nearly 15 times the VMT [vehicle miles traveled] per employee as those in the downtown CBD while making less than 65% as many trips” (ibid.:302). The greater density and mix, providing proximity to restaurants, shops, and services, and higher transit service and more restricted parking of the downtown leads to “more pedestrian trips, more transit trips, fewer automobile trips, and more eating/shopping trips during the midday” (ibid.:305). The corollary of this is that the lower levels of density and mix, and the auto-oriented design of the suburban campus and park forms leads to a dramatically higher reliance on private automobiles, both for the journey to work and mid-day travel. Douglas and Evans complement this research with attitudinal survey information from some of the same employees. They argue that the employees working in the downtown CBD enjoy a better quality-of-life than do their suburban counterparts because of their ability to leave the building at lunch time and walk to restaurants, shops, and services.

The literature on metropolitan restructuring and office suburbanization demonstrates that employment activity in urban regions in North American has become increasingly suburban, in both location and form, in recent decades. Research on land use, urban form, and travel behavior demonstrates that size, density, land use mix, and connectivity at both the trip origin and destination points impacts travel behaviour. The lessons from this literature are borne out in the following analysis of business parks.

# 3 GREATER VANCOUVER STRUCTURE

## GOVERNANCE

Greater Vancouver is the only major metropolitan region in Canada that has not been amalgamated by a provincial government. Instead, municipalities in British Columbia are clustered into geographically bounded regional districts. The Greater Vancouver Regional District (GVRD) is a partnership of twenty-one municipalities and one electoral district[4] in the northwest area of the Lower Fraser Basin, as shown in Figures 3 and 4.

Figure 3 Greater Vancouver In Context

Source: GVRD (1996:4)

[4] Member municipalities includes Electoral District A

Figure 4 Greater Vancouver Regional District


Source: GVRD (1996:2)

Collectively, these municipalities span some 329,202 hectares of land and water and are home to more than two million residents. Half (51%) of the population of British Columbia lives within the boundaries of the GVRD.

The GVRD is seen as quasi-governmental but is not directly elected; rather, municipal councils appoint their elected officials to serve as members on the GVRD Board of Directors. The GVRD is primarily a service provider, managing water, waste, sewerage and parks on a cost recovery basis. The organization manages and monitors air quality in the region and is a provider of non-profit housing. Regional planning and growth management also fall under the purview of the GVRD.

Regional planning has had something of an uneven history in British Columbia.[5] As early as 1914, municipalities in the Vancouver area were pooling their efforts to provide municipal services under the Vancouver and District Sewerage and Drainage District. In 1926 the Greater Vancouver Water District was created. In 1938 the Lower Mainland Regional Planning Association was established. Representatives from Vancouver, Coquitlam, Port Moody, West Vancouver, North Vancouver and Burnaby discussed metropolitan and regional land use issues (Christopherson, 2000). In 1949, following a major flood of the Fraser River, this association was expanded to include all municipalities as the Lower Mainland Regional Planning Board under new provincial legislation permitting regional planning (Young, 2001). In 1957 the power of the regional planning boards was strengthened when the Province amended the Municipal Act, requiring that, "following a two-thirds affirmative vote by the board, a budget or an official regional plan would become binding on the region's member municipalities"

[5] For a comprehensive analysis of regional planning in British Columbia please see Andrew Young's UBC MA Thesis *Growth Management and Regional Planning in British Columbia* (2001).

(ibid:65). In 1965 the province was organized into regional districts and in 1967 the newly formed GVRD took on the regional planning powers held by the Lower Mainland Regional Planning Board which was dissolved. The 1966 *Official Regional Plan* was updated in 1975 when the GVRD adopted *The Livable Region, 1976-1986* as the regional plan.

In 1983 the course of regional planning in British Columbia was significantly altered when many of the planning powers and functions held by the regional districts were rescinded or radically amended by the provincial government. The ability of the regional districts to enact and enforce regional plans was repealed and all regional plans were cancelled (Young, 2001). The perspective of the provincial government was that "these plans have become an unnecessary level of land use control" (Ritchie in Hansard, 1983, quoted in Young, 2001:68). The GVRD was able to maintain some level of involvement by providing municipalities with planning services on a contractual basis. The 1975 plan, *The Livable Region,* continued to guide local municipalities in Greater Vancouver even though the plan had no statutory effect (Cameron in Young, 2001).

With a change in the provincial government in the early 1990s, regional planning came back into favour. After extensive consultation with local and regional governments, the Growth Strategies Statutes Amendment Act was enacted by the BC Legislature in 1995, restoring regional planning measures to the regional districts. This Act is commonly referred to as the Growth Strategies Act and was incorporated into the Municipal Act (now called the Local Government Act). Darlene Marzari, Minister of Municipal Affairs at the time made the following statement when the legislation was introduced:

> Rapid growth is the single most powerful force propelling economic and social change in our province. Communities throughout British Columbia, particularly in the fastest growth regions, are struggling with urban sprawl, air pollution, loss of green areas and agricultural land, traffic congestion and lack of affordable housing. They're struggling because these problems transcend the local boundaries of municipalities, and British Columbia's local government planning system does not support integrated planning at the regional level (quoted in Young, 2001: 74).

The 1995 legislation did not fully restore the pre-1983 planning powers held by regional districts. Instead regional planning is now based on a cooperative model where municipalities and regional districts set out regional policy together and are expected to

resolve their differences through a dispute resolution process. Under section 866 of the Local Government Act municipalities are required to demonstrate, through a Regional Context Statement within the Official Community Plan, how their local plans are in accordance with the official regional growth strategy. In practice, implementing regional plans depends upon the collaboration and willing compliance of the member municipalities; to date, the provincial government has shown little inclination to step in if a municipality acts in a way that contradicts the regional plan.

The Province has delegated statutory control over zoning and land use to the municipal governments. The GVRD, as the regional planning body, can set out a land use and transportation plan as the strategy for managing regional growth, but the power to actually realize the plan through land use decisions is held at the municipal level. The region has some control over transportation planning and investment through the GVRD's cousin agency, the Greater Vancouver Transportation Authority (GVTA), also known as TransLink. The GVTA is responsible for the public transit system in the region, partners with municipalities to manage major roads and bridges, and has a number of initiatives to support active modes of transportation. One of the significant barriers to regional planning in Greater Vancouver is the disconnect between the "locations" of regional planning, land use decisions, and transportation planning and investment. Land use and transportation are integrally connected and they need to be in concert in order for growth management planning to be effective.

### "A NETWORK OF CENTRES"

The development of a network of regional town centres, located in the suburbs and connected to each other and the metropolitan core by high quality public transit, is a fundamental component of land use/transportation planning policy for the Greater Vancouver region. Although not predominantly featured in the official plan for the region, the *Livable Region Strategic Plan,* supporting GVRD policy documents, papers, and initiatives (GVRD 2004, 2003a, 2003b, 2003c, 2002, 2001) clearly articulate this vision of a "network of centres". In fact, promoting the development of a network of connected livable centres in the Greater Vancouver region has been regional policy for almost forty years. The 1966 *Official Regional Plan* made the general policy statement that:

> Urban growth is to take the form of a series of compact Regional Towns, each with its own businesses and civic centre and each related to industrial areas, complementing a regional business, social and financial core in downtown Vancouver.

Since the 1960s, the network of centres concept has been further developed and recast in each of the regional plans. *The Livable Region, 1976-1986* identified four regional town centres where higher density growth would be targeted and that would be linked to each other and the Metropolitan Core by rapid transit. This network of livable centres has now been expanded to include the Metropolitan core, eight regional town centres and thirteen smaller municipal town centres (See Figure 1 in Chapter 1).

The regional town centres are envisioned as complete communities, containing a mix of housing types and tenures, employment, and shops and services. Well-served by transit, the regional town centres are targeted for high density residential, major regional-serving employment, and retail, cultural and community facilities. These centres are also meant to be office locations; one million square feet of office space was targeted for each of the original four town centres. Regional policy has been to encourage office suburbanization, shifting some of the office space in the region away from Downtown Vancouver to suburban centres, but not to business parks.

### OFFICE LOCATION TRENDS

The regional town centres in Greater Vancouver are being developed as mixed use centres, with concentrations of residential, retail, and civic and cultural amenities. Between 1991 and 2001 the population of these eight centres increased by 39%, compared to a 29% increase in the regional population (GVRD, 2003a). The vast majority (82%) of the housing stock in these centres is multi-family housing in the form of apartments, both over and under four storeys (GVRD, 2003a). The amount of retail space in each of the town centres ranges from just under one million square feet to over five million square feet. A library, recreation centre, college campus, court house, museum, seniors centre, and youth centre can be found in most of the regional town centres.

The success in locating housing, retail and community amenities in the regional town centres has not been matched, for the most part, by new office development. Although regional planning policy has long called for focusing office space and employment in the regional town centres, the majority of suburban office development has occurred outside these centres in low-density settings on industrial land. Glenlyon Business Park in south Burnaby is a prime example of this (Figure 5). In 2001 the GVRD commissioned Royal LePage Advisors Inc to document and analyze office floor space in the region overall, the Metropolitan Core, defined as the Downtown Peninsula and Central Broadway, the regional town centres and business parks. [6] Although most people have an intuitive sense of what a business park is, this office sprawl is scattered in a way that makes it almost impossible to map their locations comprehensively (Lang, 2003). Royal LePage has defined business parks as office space which does not fall within the Metropolitan Core or any of the regional town centres. This matches the determinant of edgeless cities used by Robert Lang (2003) in his analysis of office space in thirteen US metropolitan areas.

Figure 5 Glenlyon Business Park


Source: Photo by K. McMillan

The total inventory of office space in the metropolitan core, the regional town centres, and in business parks in 1990 and 2000 is presented in Table 2 and Figure 6. Between 1990 and 2000, 12.8 million square feet of office space was added to the Greater Vancouver office market, achieving a total of approximately 43 million square feet of office space in the region. Less than 1 million square feet was constructed in the regional town centres while 6.8 million square feet was scattered throughout the region in business parks. Business parks grew four times the rate of the urban centres, expanding by 107%.

[6] Office space ancillary to industrial uses was excluded; only stand-alone office buildings were included in the analysis. Buildings of less than 20,000 square feet are excluded from Royal LePage's office inventory.

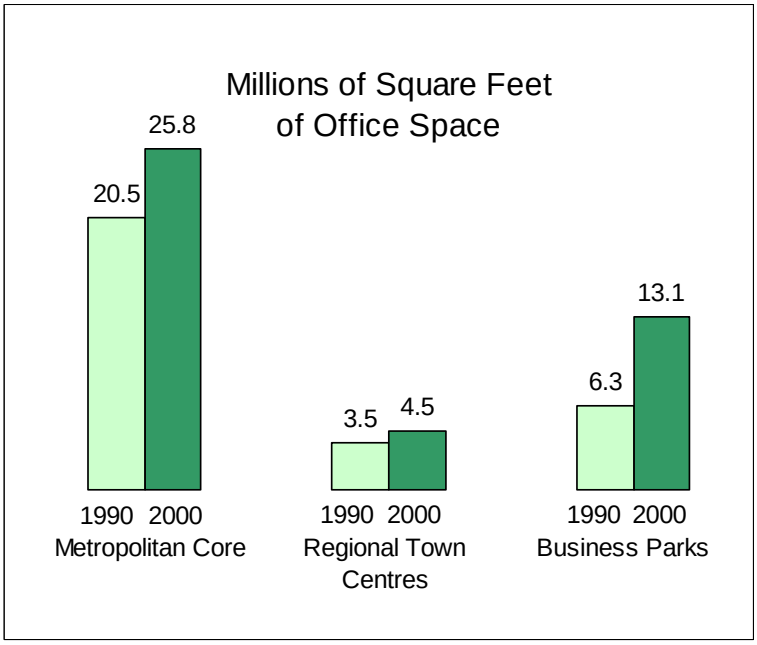
| Table 2 Greater Vancouver Office Floor Space Inventory (Square Feet) | | | | | | |
|---|---|---|---|---|---|---|
| | Floor Space Inventory 1990 | Share of Total Space 1990 | Floor Space Inventory 2000 | Share of Total Space 2000 | Change 1990-2000 | % Change 1990-2000 |
| Total Office in Region | 30,408,657 | | 43,233,934 | | 12,825,277 | 42% |
| Metropolitan Core | 20,536,109 | 68% | 25,843,541 | 60% | 5,307,432 | 26% |
| Regional Town Centres | 3,536,328 | 12% | 4,473,528 | 10% | 937,200 | 27% |
| Business Parks | 6,336,220 | 21% | 13,086,865 | 30% | 6,750,645 | 107% |

Source: Royal LePage (2001)

Royal LePage summarized this development pattern:

The Greater Vancouver office market has shown a decided preference for business park locations. In the early 1980s, Vancouver was one of the most centralized office markets in North America. Since that time it has undergone radical decentralization, similar to other North American cities. The town centre plan, which anticipated decentralization, but expected it to locate into nodes, has not been successful here or in most other North American cities. (Royal LePage, 2001:23)

Figure 6 Office Space in Greater Vancouver




Source: Royal LePage (2003)

Offices accommodate significantly more employees per square foot than industrial or manufacturing operations. A typical office building in an urban centre in the Vancouver region has about 200 square feet of floor space for every employee; business park

office buildings provide slightly more space for their workers, at 210 square feet per person (Royal LePage, 2001). The 43 million square feet of office space in the region represents over 215,000 jobs, as presented in Table 3. The majority of these jobs are located in the metropolitan core, but over 62,000 office jobs are located in business parks. It is significant that auto-oriented business parks have almost three times as many office jobs as do the regional town centres. The growth in the 1990s resulted in an additional 33,563 people working in stand-alone offices in business parks and only an additional 5,434 people working in offices in the regional town centres.

Table 3 Office Employment in Greater Vancouver

| | Office Jobs 1990 | Share of Total Office Jobs 1990 | Office Jobs 2000 | Share of Total Office Jobs 2000 | Change 1990-2000 | % Change 1990-2000 |
|---|---|---|---|---|---|---|
| Total Office in Region | 145,179 | | 215,048 | | 69,870 | 48% |
| Metropolitan Core | 99,492 | 69% | 130,365 | 61% | 30,873 | 31% |
| Regional Town Centres | 17,133 | 12% | 22,566 | 10% | 5,434 | 32% |
| Business Parks | 28,554 | 20% | 62,117 | 29% | 33,563 | 118% |

Notes: Based on office floor space estimates and square feet per employee averages, Royal LePage (2003)

## MARKET INTEREST

To many, a business park location is attractive for several reasons. Business parks are situated on large vacant sites ready for development, enabling a developer to generate a master planned, phased project, enjoying economies of scale. Compared to constructing towers in urban centres, ready-made large parcels and slab-on-grade construction with surface parking enable faster timelines thereby decreasing risk for the developer. Office developers are comfortable with the single-purpose business-oriented zoning of business parks, which reduces uncertainty in land use and land prices. Land clearly zoned for office space clarifies the highest and best use and increases the likelihood that adjacent land will be used for similar purposes.

The ability to occupy a building with a large floor plate where a firm's floor space requirements can be accommodated on one to three floors is important to some office tenants. Large parcels and lower required densities allow for more flexible building design and most buildings are "built to suit". Some office tenants prefer, for business

reasons, to own their own building. Because of the lower land and development costs in business parks, and the possibility for smaller buildings, it can be more financially feasible for a smaller user, such as the Hospital Employees Union based in Glenlyon Business Park, to own a building in a business park.

One of the most often cited explanations for market interest in business parks is that they are less expensive than urban centre locations. Cheaper land and development costs are said to translate into lower net effective rents and operating costs. In reality, the cost differentials between business parks and urban centres are not as clearly defined as many assume. While land costs are cheaper compared to centres, the development costs may not be. For example, building on unstable land or flood plains requires extensive pre-loading and piling that translate into much higher construction costs than building on stable foundations. Darrell Hurst, a real-estate broker at Avison Young in Vancouver, suggests that the cost to the tenant in business park locations can be less expensive, but not necessarily (2004). In his experience, the rents in the business parks in the Willingdon/Canada Way area are in the same range as the rents in Metrotown. However, the higher vacancy rates seen in the last few years in the Vancouver office market have led many business park owners to offer substantial inducements to tenants (ibid.). An owner may be more motivated to reduce rents and offer inducements in business parks than in a larger building in a centre where vacant space can be absorbed for a longer period of term. On the other hand, because most business parks in the Vancouver region feature recently built, high amenity class A

*A different perspective:*

*Bill Gibson, former President, Western Region of Rogers Wireless and now a Senior Vice President at Business Objects, resisted relocating Rogers from Metrotown to a business park. Rogers was a growing company at the time and Gibson was concerned about retaining his employees and attracting new people. This meant staying close to the high level of transit service, the child care facilities, and the plethora of restaurants available in Metrotown. According to Gibson, Rogers could* possibly *have saved money by relocating to a business park, but any savings gained from reduced rents and operating costs would be negated by increased costs resulting from higher turnover rates. To Gibson, relocating to a business park would not only increase turnover rates in the short-term, but would result in a higher sustained turnover rate over the long term, a "huge cost that would vastly surpass any savings incurred by cheaper rents." Business Objects, a software company, is located in Yaletown, a trendy area of the Metropolitan Core, "where young people want to be – close to transit, shops, food – its diverse and its interesting." With a turnover of only 15% (low in the software industry) Gibson is convinced that the money spent on higher rents is well worth keeping their employees happy. "Happy employees equal happy customers which equals good business" (Gibson, 2004.).*

buildings, an older or class B building in a centre may in fact offer lower rents and operating costs than a business park (Wollenberg, 2004).

Parking and private vehicle access is clearly seen as a key advantage of business parks. Marketing of business park developments almost always emphasizes proximity to major transportation corridors, particularly highways. The "central location" of the business park is advertised by citing the number of minutes by car to destinations such as the airport, the border, and downtown. In business parks, generous amounts of surface parking can be provided at less than half the cost of structured parking, allowing companies to provide their employees with free parking (Royal LePage, 2001).

## LOCAL EXAMPLES

While business parks are found throughout the region, in Vancouver, Surrey, North Vancouver, Langley, New Westminster and on the University of British Columbia campus, the majority of business parks in the Vancouver area are found in the Cities of Richmond and Burnaby. The City of Burnaby promotes business parks in sixteen Business Centres in the municipality. Figure 7 is taken from the City of Burnaby website that features their business parks.


Figure 7 City of Burnaby Business Centres

1. Discovery Place - BCIT
2. Discovery Place - SFU
3. Marine Way Estates
4. Marine Way/Boundary
5. Glenlyon Business Park
6. Riverfront Business Park
7. Burnaby Business Park
8. Glenwood Industrial Estates
9. Bridge Business Park
10. Holdom Business Centre
11. Lake City Business Centre
12. Willingdon Business Park
13. Dominion/Canada Way
14. Eastbrook Executive Park
15. Willingdon Green Business Centre
16. Deer Lake Business Centre

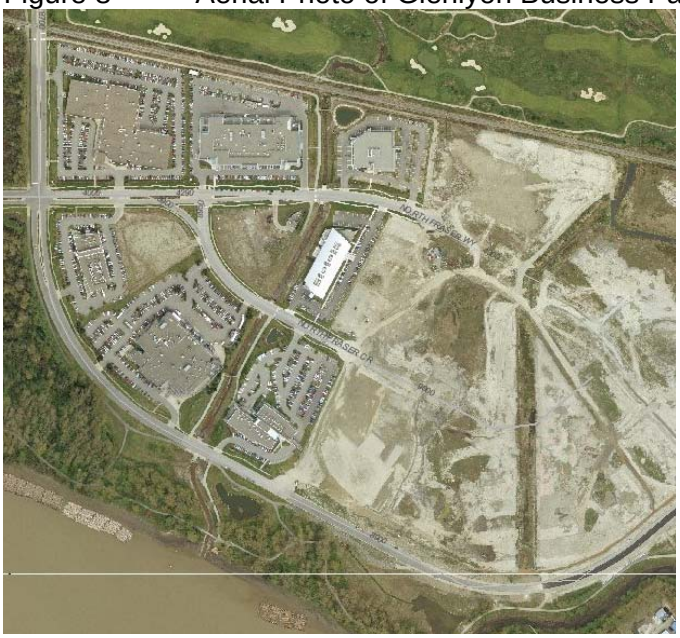
(Source: City of Burnaby, 2004)

*Glenlyon Business Park*

Glenlyon Business Park (#5 on Figure 7) is a 130 acre site owned by Canada Lands Company Limited, the federal Crown Corporation that commercially develops surplus federal land. Glenlyon is located in southern Burnaby, in the so-called, Big Bend area. Built-to-suit development began in the mid 1990s and, to date, 650,000 square feet of office space, with some light industrial, has been built on 42 acres. A total build-out of two million square feet is scheduled for development. Best Buy/Future Shop (head office) and Ballard Power (mix of light industrial and office) were the first tenants to locate in Glenlyon. Other tenants now include Telus Corporation, Nokia, BC Hospital Employees Union, Sulzer Mitroflow, and Inex Pharmaceuticals.

Figure 8 is an aerial photo of Glenlyon Business Park. Access is from Glenlyon Parkway which connects to Marine Way, a major vehicle corridor with four lanes of traffic, turning bays, and a speed limit of 80km/hour. As illustrated in this photo, the lots are large and the buildings are set-back from the road. Each building is surrounded by surface parking. Glenlyon abuts Fraser Foreshore Park, which is a river-side forested park with meandering trails. While there are sidewalks in Glenlyon, there is nothing within walking distance, other than Fraser Foreshore park. The empty lots on the eastern portion of the site have been prepped, but are still awaiting development

Figure 8 Aerial Photo of Glenlyon Business Park



Source: City of Burnaby (BurnabyMap)

Table 4 presents site, density, and parking ratio details of Glenlyon as an example of a business park in Burnaby. The average density of Glenlyon is 0.35 FSR. On average, 3.7 parking stalls are provided for every 1000 square feet of floor space. The lowest parking ratio is for 4343 North Fraser Way, one of the older buildings on the site and 40% manufacturing. 8800 Glenlyon Pkwy originally had 480 parking spots, a ratio of 4.0, but this proved insufficient and an additional 300 parking spots were secured in an overflow lot. 6.5 spots per 1000 square feet are now provided and still employees turn to the street for parking. In each of these developments the amount of parking provided exceeds the amount of parking required under City of Burnaby Rezoning References. However, there is still insufficient off-street parking to accommodate all employee cars and the curbs of Glenlyon Parkway and North Fraser Way are lined with parked cars.

Table 4 Site Details: Glenlyon Business Park, Burnaby

| Glenlyon Business Park | Use | Floor Space (sq. feet) | Floor Space Ratio | Parking Provided | Parking Stalls per 1000 sq. ft. |
|---|---|---|---|---|---|
| 8800 Glenlyon Pkwy | Office | 120,150 | 0.34 | 780 | 6.5 |
| 9000 Glenlyon Pkwy | Office & Research | 109,907 | 0.31 | 345 | 3.1 |
| 4343 North Fraser Way | Office & Manufacturing | 111,244 | 0.40 | 260 | 2.3 |
| 5000 North Fraser Way | Office | 54,929 | 0.35 | 160 | 2.9 |
| 8900 Glenlyon Pkwy | Office & Research | 50,355 | 0.43 | 153 | 3.0 |
| 9100 Glenlyon Pkwy | Office | 67,513 | 0.30 | 244 | 3.6 |
| 9200 Glenlyon Pkwy | Office | 90,688 | 0.35 | 309 | 3.4 |
| 5005 North Fraser Way | Office | 50,140 | 0.29 | 199 | 4.0 |
| Total Glenlyon | | 654,926 | 0.35 | 2450 | 3.7 |

Source: City of Burnaby

There is one bus route that serves Glenlyon. During peak hours on weekdays (7-9:30am and 3:15-6:15pm) the 116 from Metrotown SkyTrain Station extends its regular residential route from Marine Drive to do a loop through Glenlyon. Service is every fifteen minutes. Outside of these hours the closest bus stop is on Marine Drive, a fifteen minute walk from Glenlyon. One third of this walk is along the gravel shoulder of Marine Way with traffic passing at 80+km/hour.

In Richmond, the Crestwood area along the Knight Street corridor contains older light industry uses in industrial parks, a large auto mall, and newer large floorplate 2-3 story office buildings in business parks. Office space is also being marketed in the Riverport Business Park immediately north of the George Massey Tunnel on Highway 99. The airport, which falls within Richmond but under federal jurisdiction, has significant capacity for business park development. Existing developments along the Knight Street Corridor include: Crestwood Corporate Centre; Great Northern Technology Park; International Business Park; Riverport Business Park; and Fraserwood Corporate Centre. The Airport Executive Park at Shell and Cambie Rd is one of the oldest business parks in the region. The original buildings date back to the mid 1970s – the newest building is a Class A office building constructed in 2002.

Crestwood Corporate Centre (Figure 9) is Richmond's most modern business park, developed in the mid to late 1990s. Ten Class A office buildings house 31 tenants; only two of the buildings are occupied by a sole tenant. Crestwood is flanked by three major thoroughfares. To the north is Westminster Hwy, to the west is Knight Street, also a highway level road at that point, and to the east is No. 6 Rd. There are barriers preventing any access to Westminster Hwy and Knight St. Access to Crestwood is via two entrances on No. 6 Rd which is a major four-lane road, heavily used by trucks and other car traffic. The site plan for Crestwood Corporate Centre is presented in Figure 10. Most of the buildings are situated far apart from each other and a fair distance back from the road. Every building is surrounded by surface parking. There is a sidewalk on only one side of Commerce Parkway, the road running through the middle of Crestwood. There is also a wood-chip walking trail that runs the interior circumference of the site, providing a walking route at lunch time.

Figure 9 Crestwood Corporate Centre


Source: Photo by S. McMillan

Figure 10 Site Plan of Crestwood Corporate Centre


Source: Photo by S. McMillan

Table 5 presents site, density, and parking ratio details of Crestwood Corporate Centre as an example of a business park in Richmond.

Table 5 Site Details: Crestwood Corporate Centre, Richmond

| Crestwood Corporate Centre | Use | Floor Space (sq. feet) | Floor Space Ratio | Parking Provided | Parking Stalls per 1000 sq. ft. |
|---|---|---|---|---|---|
| 13800 Commerce Pkwy | Single Tenant Office | 182,256 | 0.56 | 607 | 3.3 |
| 13777 Commerce Pkwy | Multi-Tenant Office | 83,350 | 0.50 | 278 | 3.3 |
| 13575 Commerce Pkwy | Multi-Tenant Office | 78,423 | 0.43 | 261 | 3.3 |
| 13511 Commerce Pkwy | Single Tenant Office | 96,835 | 0.49 | 323 | 3.3 |
| 13799 Commerce Pkwy | Multi-Tenant Office | 62,051 | 0.48 | 207 | 3.3 |
| 13711 International Pl. | Multi-Tenant Office | 82,838 | 0.60 | 276 | 3.3 |
| 13700 International Pl. | Multi-Tenant Office | 82,838 | 0.59 | 276 | 3.3 |
| 13775 Commerce Pkwy | Multi-Tenant Office | 83,350 | 0.71 | 278 | 3.3 |
| 13571 Commerce Pkwy | Multi-Tenant Office | 78,000 | 0.46 | 260 | 3.3 |
| 13351 Commerce Pkwy | Multi-Tenant Office | 84,101 | 0.80 | 280 | 3.3 |
| 13353 Commerce Pkwy | Multi-Tenant Office | 63,422 | 0.73 | 211 | 3.3 |
| Total Crestwood | | 977,464 | 0.56 | 3,258 | 3.3 |

Source: City of Richmond; BC Assessment Authority; www.space4lease.com

Getting to Crestwood on public transit is, at best, unpleasant and, at worst, dangerous, but the service is fairly frequent. The 410 from Richmond Centre to 22nd Street Station runs from about 6am to midnight and stops approximately 1/2km from the Crestwood entrance. During peak hours this bus runs on 9-12 minute headways. In the mornings and afternoons five buses make a detour and stop directly outside the Crestwood entrance. However, getting to the regular stop involves walking on a narrow sidewalk along No. 6 Rd, with large trucks and cars speeding by. There is no buffer of any kind between the sidewalk and the road. Pedestrians must pass under a highway overpass and most of the walk is next to a large empty lot. As there is only a sidewalk on one side of the road, pedestrians must run across No. 6 Rd in order to get to the bus stop. Pedestrians must cross, without a crosswalk, at a point immediately north of a highway exit ramp, on a road where the majority of the traffic is moving at least 80km/hour.

## MUNICIPAL POLICY

Market demand alone does not explain the phenomenon of business parks; the existence of business parks is directly related to the willingness of municipalities to permit them. The following section reviews the extent to which Burnaby and Richmond, the studied municipalities, support and permit stand-alone office buildings in areas outside of centres, particularly in industrial areas. The zoning bylaws and the Official Community Plans of Burnaby and Richmond are reviewed. Zoning bylaws distinguish between two types of uses: outright and conditional. Whereas an owner has the right to undertake an “outright use” on the land, a “conditional use” requires special approval that may or may not be granted.

### *BURNABY*

The industrial land strategy set out in Burnaby’s Official Community Plan (City of Burnaby, 2004a) includes creating Business Centres which are “oriented to smaller, corporate headquarter facilities and businesses involving combinations of research, sales/service, light manufacturing and management/administration” (Section 5.4.3). One of Burnaby’s goals is to “make effective and efficient use of available industrial lands, seeking to attract and accommodate high quality employment-intensive industries and overall increases in floor space densities” (ibid.: Section 6.2) To achieve this, Burnaby’s Official Community Plan (OCP) directs that the zoning bylaw should be

amended to “encourage intensification of the use of industrial lands, meet contemporary needs and promote higher employment levels” (Section 6.3).

The City of Burnaby zoning bylaw (Section 450) includes Suburban (B1) and Urban (B2) Business Districts that provide for the “accommodation of [suburban/urban] office uses for business and professional offices, research and development, and associated specialized manufacturing uses within a business park environment”. Business, professional, and high technology offices are permitted, while retail service offices are excluded. Developments in these districts are located in a business park environment and are subject to the provisions of the Comprehensive Development (CD) District. Suburban Districts are expected to accommodate in excess of 50 employees per acre at Floor Space Ratios (FSR) no greater than 1.0. Urban Districts should accommodate in excess of 75 employees per acre at no greater than 1.5 FSR. Off-street parking must be provided at a minimum level of 2.5 spaces for every 1000 square feet of gross floor area for office uses. There is no maximum threshold for parking provided.

The City of Burnaby also allows for “business and professional offices” as an outright use in the Light Industrial (M5, M5r, M5L) Districts (Section 405). This seems to be in contradiction with the OCP where the directions relating to the Commercial Framework include removing business and professional offices from the M5 District “to better help the focusing of office development within designated development areas” (Section 5.3).

*RICHMOND*

Richmond’s OCP (1999) demonstrates the municipality’s willingness to locate office development within their industrial areas. Richmond uses a definition of industry that includes “advanced technology and other office-based businesses” (OCP 2.3). 1996 data included in the OCP states that “office based businesses comprised 36% of the total number of businesses in all Industrial zones and accounted for about 29% of all industrial jobs.” To further their objective of establishing Richmond as a “preeminent location for advanced-technology or knowledge-based businesses”, the OCP policy calls for an expansion of:

> [T]he number of industrial sites in which independent offices are permitted, in order to accommodate office-based businesses e.g. software development, research, brokers, contractors. This may be achieved by rezoning strategically located industrial sites (OCP 2.3)

There are currently five Industrial Districts in the City of Richmond. Offices are not permitted in I1 (Industrial District), I2 (Light Industrial District) or I5 (Industrial Storage District). The Business Park Industrial District (I3) permits offices outright, intending to "provide for clean industrial uses together with independent office uses." The Limited Industrial Retail District (I4) also permits offices. The intention of the I4 zoning district is "to provide for clean industrial uses, independent office uses and specified limited retail uses" (Bylaw 5300, Sections 271 thru 275).

FORECAST

The existence of business parks is directly related to market demand, the supply of available land, and the willingness of municipalities to permit development. The industrial zoning bylaws and OCPs of Burnaby and Richmond (reviewed above) make very clear that these municipalities are pursuing office development on industrial land. Assuming that municipalities continue to allow stand-alone office development on industrial land, there is a significant supply of land in the region for the further expansion of business parks. In Burnaby, the sixteen designated business parks have large amounts of undeveloped capacity. Lake City Business Centre (north of Lougheed Hwy, east of Gaglardi Way) is a 400 acre industrial site that has been designated for redevelopment as a "business centre focusing on office, high-tech and specialized uses" (Burnaby website). In the Big Bend area, 78% of the 330 acres identified as business parks (Glenlyon, Burnaby Business Park, and Glenwood), remain slated for future development. Both the Richmond and Delta sides of the south arm of the Fraser River have potential sites for further business park development. In Richmond, the Knight Street corridor, the Highway 99 corridor, and Sea Island are possible locations of development and redevelopment of business parks.

Royal LePage (2003) forecasts that over the next fifteen years the amount of office space in business parks will more than double, increasing by 112% by 2012. The rate of growth in the region's urban centres, including the Metropolitan Core, will be much slower. Royal LePage expects that office in centres will only increase by 36% by 2012. They expect that downtown Vancouver will continue to be strong but that "a large share [of office space] is also expected to locate in the new suburban business parks, particularly in Burnaby. For many important practical and financial reasons, business

parks are expected to remain a very strong form of office development. There is ample future land supply for this land use" (Royal LePage, 2003:i).

Market analysts at Colliers International, a commercial real estate firm, are also confident that the business park concept will remain a predominant feature in future office development. Ron Bagan, Executive Managing Director, Western Division at Colliers International predicts that over the next one to three years the existing vacant inventory in business parks will be absorbed and proposals for new buildings will be submitted to the municipalities. Bagan's perspective is that most of the future office development will occur in Burnaby business parks and "not in most of the other industrial areas that municipalities are trying to flog as office locations" (Bagan, 2004). It is a mistake, in Bagan's view, for municipalities to target all their industrial land for office development and to restrict the development of clean industrial uses. At this point in the market, smaller office tenants who want to own their own buildings, such as the Hospital Employees Union and the BC Government and Service Employees Union, will relocate to industrial land in the outer suburbs but most of the office market demand will be focused downtown and in business parks in Burnaby.

Analysts at Avison Young, another commercial real estate company in the region, also predict an uptake in the Vancouver office market, but are forecasting that the demand for office space will gravitate more towards urban centres. They identify Yaletown as a "cutting edge new urban district" and "the hub of the high technology and knowledge economy sector" (Avison Young, 2004). They expect increased activity in the Broadway corridor and also in Richmond centre with the anticipation of the RAV line. Avison Young's Greater Vancouver Office Market Report published July 2004 highlights "four emerging trends in office selection and leasing that every landlord, tenant, and urban planner should note". The number two prediction reads:

> DEMAND FOR BUILDINGS DOWNTOWN AND IN TOWN CENTRES TO INCREASE
>
> Most companies cannot afford to offer everything their employees want on site. These office tenants will look to the surrounding community as well as landlords to provide some amenities such as workout rooms, pilates classes, coffee bars, pubs or a park.

> These amenity requirements are increasingly pulling many tenants away from isolated business parks and toward downtown, town centres and other highly urban areas (such as West Broadway). Transit access is also a concern or even a requirement for many companies.

Forecasting the market demand for office space can be a difficult task because there is no guarantee that past trends will continue. There was a big push in business park development in the mid to late 1990s, which slowed significantly with the drop in the high tech industry. The predictions, build-out schedules, and development plans conceived during that time have not come to fruition. While the pace of development has been slower in the few years since the "Dot-Com Bomb," the trend of locating office space in suburban business parks shows no sign of stopping. While the Core remains strong, so far, the growth in business parks is far outpacing both the core and the regional town centres.

# 4 EVALUATIVE FRAMEWORK

The three primary research questions set out in Chapter One are answered by evaluating business parks in Richmond and Burnaby against eight planning criteria. This analysis demonstrates the extent to which business parks support regional planning goals, sustainability principles, and municipal objectives. This section establishes an evaluative framework that sets out these criteria, the origin of the criteria, the key indicators, and the key measures used to determine whether business parks succeed in meeting these criteria. Regional Town Centres provide a point of comparison.

## REGIONAL PLANNING GOALS

Regional plans in British Columbia are legislated under the 1995 Growth Strategies Act. This Act sets out the purpose of a regional growth strategy: to "promote human settlement that is socially, economically and environmentally healthy and that makes efficient use of public facilities and services, land and other resources" (BC Legislature, 1995:942.11). Laying out a vision for sustainable regions, the Growth Strategies Act specifies fourteen planning objectives towards which regional growth strategies should

work (Appendix A). The first three objectives are particularly relevant to this discussion of business parks:

- Avoiding urban sprawl and ensuring that development takes place where adequate facilities exist or can be provided in a timely, economic and efficient manner;
- Settlement patterns that minimize the use of automobiles and encourage walking, bicycling and the efficient use of public transit;
- The efficient movement of goods and people while making effective use of transportation and utility corridors.

This legislation frames the GVRD's *Livable Region Strategic Plan* (LRSP), which was endorsed by all member municipalities in 1996, and approved by the provincial government as Greater Vancouver's regional growth strategy. The LRSP clearly articulates an overarching vision for the future development of the region. The purpose of the LRSP is to help realize the following vision, adopted in 1990:

> *Greater Vancouver can become the first urban region in the world to combine in one place the things to which humanity aspires on a global basis: a place where human activities enhance rather than degrade the natural environment, where the quality of the built environment approaches that of the natural setting, where the diversity of origins and religions is a source of social strength rather than strife, where people control the destiny of their community, and where the basics of food, clothing, shelter, security and useful activity are accessible to all.* (GVRD, 1996:18)

The vision and goals espoused in this plan embody the concept of sustainability. There are four interrelated goals set out in the LRSP. These fundamental strategies, established to create a more livable region, will be the basis of four of the criteria for evaluating business parks. They are:

- Achieve a Compact Metropolitan Region
- Increase Transportation Choice
- Build Complete Communities
- Protect the Green Zone

While the LRSP is strong on vision, it is weak on specific guidelines and actions to realize this vision. Forty-three policies have been laid-out to achieve the four primary goals but these policies are permissive statements that cover the types of things that

should happen, rather than being restrictive in any way. The following paragraphs review the ideals set out for each of the four strategies and the policy directives that are most relevant to this paper on the location of office development.

### CRITERION 1: ACHIEVE A COMPACT METROPOLITAN REGION

The goal of a **compact metropolitan region** means using land more efficiently in order to avoid urban sprawl and the outward expansion of the urban-rural fringe. To achieve this, the LRSP seeks to concentrate population growth within the central part of the region in communities that accommodate medium and higher-density residential areas. The ideal of "managing growth more efficiently in order to maintain environmental quality and create more balanced and livable communities" (GVRD, 1999:12) entails concentrating growth within the Growth Concentration Area and using developed land as efficiently as possible. While the policies set out for achieving a compact metropolitan region largely pertain to focusing residential development and population growth within the Growth Concentration Area, policy 11.4 calls for focusing employment and residential development in centres served by public transit:

> *Seek through partnerships on a compact metropolitan region achievement of adequate population and employment densities in centres and transportation corridors to support planned transit services;* (GVRD, 1996:22)

Two key questions address whether business parks support the goal of achieving a compact metropolitan region are:

- Are business parks an efficient use of land?
- Do business parks contribute to achieving adequate employment densities in centres and transportation corridors supported by existing transit services?

The measures used to analyze the response to these indicators are: Floor Space Ratio, an analysis of surface parking data, and transit access. Site density (Floor Space Ratio) is used to determine the amount of land consumed by business parks and is compared to the land required for a typical office building in an urban centre. The provision of surface parking is a prominent and identifying feature of business parks. The amount of land consumed specifically for parking is documented as an additional measure of land

efficiency. The location of the case study business parks are mapped in relation to existing high capacity transit services and urban centres.

### CRITERION 2: INCREASE TRANSPORTATION CHOICE

The goal of **increasing transportation choice** is rooted in a recognition that the dependence on private automobiles is neither environmentally nor economically sustainable. The LRSP calls for managing growth and development in ways that discourage single occupant vehicle travel, reduce travel distances and emphasize transit, cycling and walking. Policy 13 calls for multi-lateral partnerships to:

> *plan and deliver a transportation system that supports the protection of the Green Zone, the development of complete communities and the realization of a compact metropolitan region.* (ibid:23)

Policies 14 and 15 emphasize Transportation Demand Management as strategies to increase transportation choice:

> *Pursue Transportation Demand Management (TDM) strategies as a fundamental transportation requirement for achieving the goals and objectives of this Strategic Plan.* (ibid.)

Policy 16.1 specifies that the transportation system should be based on fixed public transit infrastructure:

> *Seek through partnerships on increasing transportation choice to plan and implement a transit-oriented and automobile-restrained transportation system for the region based on intermediate capacity transit facilities (including light rail transit, SkyTrain and high-capacity busyways) within the identified corridors.* (ibid.)

The following questions introduce the two key indicators of the extent to which business parks support the goal of increased transport choice:

- Are business parks accessible by a range of transportation choices?
- Do business parks support a transit-oriented and automobile-restrained transportation system?

The ability to access business parks by different modes of transportation is assessed below. The key measure of whether a range of viable transportation choices are

available is the journey to work mode split, that is, the proportion of people commuting to work by private vehicle, transit, walking, and cycling. Mode split data are presented for business parks in comparison to the regional town centres and the metropolitan core.

### CRITERION 3: BUILD COMPLETE COMMUNITIES

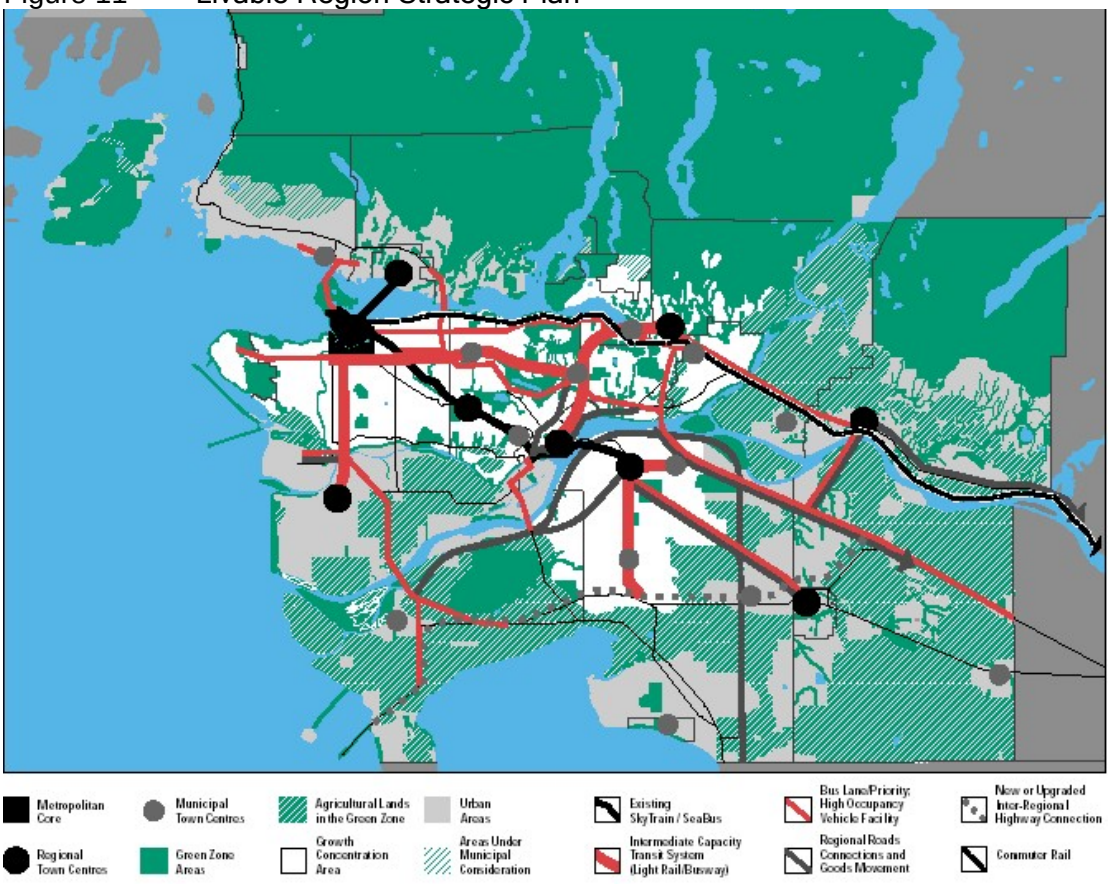
*Greater Vancouver residents have expressed a strong desire to re-shape regional growth in a way that would create more complete communities. These communities would offer greater diversity, choice and convenience, where people could live, work and play without having to travel great distances to do so.*
*~LRSP (GVRD, 1996:11)*

In order to realize the goal of **building complete communities,** development must be focused in locations where a variety of uses and activities, including residential, are within close proximity and are well integrated at a human scale. The foundation for building complete communities, and central to achieving all four growth management strategies, is the LRSP's network of town centres. While the explanatory notes to the LRSP articulate that the network of regional and municipal town centres are "intended to be primary concentrations of jobs, housing, culture and recreation opportunities" (GVRD, 1996:11) the actual legislated policies refer to this network of centres only indirectly. Policy 8.4 states:

> *Seek through partnerships on complete communities development of a network of high-quality, mixed activity urban centres supported by an appropriate level of public transit and a range of community services and cultural facilities for residents and employees;*

In the official adopted plan, the only explicit reference to the network of town centres and the corresponding transit connections is found on the LRSP Map, presented in Figure 11.

Figure 11 Livable Region Strategic Plan




Source: GVRD (1996: 32)

Two key questions are asked to determine whether business parks support the goal of complete communities:

- Are business parks integrated locations where people can live, shop, and access services?
- Does the expansion of business parks contribute to the development of the regional town centres?

To measure whether business parks are close to locations where people live, the distance between home and work for people who are employed in a business park in Burnaby is compared to the average home-work distance for Greater Vancouver residents. The populations living within ½ km, 1km, and 1½ km of business parks in Richmond and Burnaby measure the theoretical possibility of living close to work when one's job is based in a business park. The proximity to restaurants and shops is

discussed. Qualitative data gleaned from interviews with business park employees reveal perceptions and feelings about working in a business park location.

### CRITERION 4: PROTECT THE GREEN ZONE

The **Green Zone**, land where no intensive urban development is to occur, is comprised of two-thirds (205,000 hectares) of the land base of the region (GVRD, 2003b). The primary purpose of the Green Zone is twofold: first, to protect the region's natural assets including parks, watersheds, and agricultural land; and second, to establish a long-term boundary for urban growth. A number of policies are set out to protect the Green Zone:

> *4. Seek through partnerships on the establishment of the Green Zone:*
>
> *4.3 increased protection for Green Zone areas at risk from urban development;*
>
> *4.6 the minimization of pressure on the Green Zone through management of urban areas;*

The key question pertaining to the protection of the Green Zone asks:

- Do business parks minimize pressure on the Green Zone?

This question is addressed via a comparison of pressure on the green zone between a condensed, high-density pattern of metropolitan growth and a dispersed, sprawling pattern of metropolitan development.

#### SUSTAINABILITY PRINCIPLES

Without being explicit about sustainability, the four LRSP goals nonetheless lay the foundation for a sustainable region and are not mutually exclusive from the following two criteria. To explicitly include principles of sustainability in this evaluation framework, business parks are assessed against the goals of improving environmental integrity and promoting social equity. As articulated by the European Conference of Ministers of Transport, environmental integrity and social equity are integral to urban sustainability.

> How people and goods move from one place to another in cities is a major factor in whether objectives for urban sustainability are met. Indeed, assuring that the growing numbers of urban and suburban dwellers in *all socio-economic*

> *strata* have access to the services and *activities integral to their daily lives*, while *minimizing the negative environmental*, *equity, economic and health impacts of travel*, is the principle goal and challenge facing transport and land-use policy-makers at this time. (ECMT 2002:9, emphasis added)

Business parks are evaluated from an economic perspective under the municipal objectives outlined in criteria seven and eight.

### CRITERION 5: IMPROVE ENVIRONMENTAL INTEGRITY

The structure of metropolitan regions, particularly urban form and transportation patterns, directly affects **environmental integrity** both within and beyond the boundaries of these urban areas. The National Round Table on the Environment and the Economy argues that "urban form, urban transportation and energy use in urban buildings form a nexus at the heart of urban environmental quality" (NRTEE 2003:4). Where people live, work, shop, play, and access services and how they travel between these locations contribute significantly to energy consumption which, in turn, affects air quality and greenhouse gas emissions. An increasingly larger amount of the world's population, both in terms of proportion and raw numbers, live in urban areas. In Canada, 80% of the population lives in cities and Canadians are the second highest per capita energy-consumers in the world (NTREE, 1997). Reducing the non-renewable energy consumption of urban residents, particularly city-dwellers in North America, is fundamental to improving regional, national, and global environmental integrity.

Under this criterion, environmental impacts of business parks are considered at three geographic levels. Site specific improvements, such as remediation, that can be leveraged through business park development are considered. Employee perceptions of the quality of the business park site are also presented. At the level of the region, the impacts of business parks on air quality are considered. While technological advances have resulted in greater fuel efficiency, air pollution from transportation continues to gets worse as the number of cars and kilometres driven increases (ibid.). Issues of land consumption and preservation of green space in the region are addressed under other criteria.

Likely the most serious threat to the integrity of the environment is global climate change resulting from greenhouse gas emissions. In 1995 the Intergovernmental Panel on Climate Change, which represents 2,500 leading scientists from around the world, declared that "the balance of evidence suggests a discernible human influence on global climate" and that "projections of future global mean temperature rise confirm the potential for human activities to alter the Earth's climate to an extent unprecedented in human history" (quoted in NRTEE, 1997:11). Increasingly erratic weather patterns and severe weather events, including forest fires, tornados, and flooding, are evidence that the globe is already experiencing the effects of climate change (Sierra Club of Canada). To determine the impact business parks have on global climate change, the transportation-generated greenhouse gas emissions produced by employees are compared for a business park and town centre location. This is also compared to greenhouse gas savings from Green Building infrastructure.

### CRITERION 6: PROMOTE SOCIAL EQUITY

The issue of **social equity** cuts across all segments of contemporary society, including planning practice and theory. A social justice perspective sould contribute to all planning questions. Planners and elected officials work for the public good and should strive to improve the quality of life and well being of all members of society. In this evaluation, social equity is addressed in terms of the ability to access employment opportunities. Access to employment involves having suitable jobs available for people of a range of backgrounds and education levels. It also means having the ability to get to the locations where the jobs are. It is this latter aspect that this evaluation of office location considers.

The relationship between metropolitan structure, transportation, equity and access are explored in the Environmental Justice (EJ) movement and literature. The EJ movement began with protests against the fact that lower income and traditionally excluded people bear a disproportionate burden of the negative impacts of certain land uses and transportation infrastructure. Robert Bullard's book *Dumping in Dixie* (1994) is a seminal text in this field, as is his 1997 edited (with Glenn Johnson) collection entitled *Just Transportation.* Equal access to employment is a focus within the EJ literature and has been recognized by US Courts (Cairns et al, 2003).

The starting point for much of the work on transportation and justice is John Kain's work in the 1960s on economic opportunity and race. Developing his "spatial mismatch" theory, Kain investigated the relationship between African American employment rates and housing market segregation. He found that the postwar suburbanization of employment seriously aggravated the ability of African Americans to access employment because of the poor transportation linkages between the neighbourhoods where African Americans resided and the location of jobs. Subsequent researchers have tested and applied this theory to more contemporary contexts, addressing other disadvantaged groups, further suburbanization and economic restructuring (see Preston & McLafferty, 1999, for review of literature on this topic).

Amy Helling (2002) argues that the sprawling character of our cities requires ownership of a private vehicle in order to access the housing and jobs in suburbs and therefore is exclusionary to low income people and families who do not have the means to purchase a car. In her work on transportation programs for welfare participants, Blumenberg (2004) argues that long-distance commutes can be costly in both time and money and therefore difficult to sustain, particularly for single mothers. She suggests that life is much easier for women, particularly low-income and single mothers, when there are jobs, services, and housing at a range of prices within close proximity. In their 1986 article on office suburbanization in the *Atlantic Monthly,* Leinberger and Lockwood argued that the suburbanization of office space was "time and energy efficient for executives and business owners but not necessarily for clerical, light-assembly, and service employees [who] face a long – and often expensive – car or bus commute to the suburban or city home they can afford to live in" (1986:49).

The location of jobs and the ability of people of all income ranges to access these jobs is a critical indicator of the social sustainability of a region. The LRSP vision calls for a region where "useful activity [is] accessible to all". The key question is whether the jobs in business parks are accessible by people in all socio-economic strata? Building on the indicators considered under increasing transportation options, the costs of owning a car are compared to the costs of taking transit. The experiences of individuals who work in the business parks studied in this research illustrate the ease of access to employment.

MUNICIPAL OBJECTIVES

The GVRD is a collection of all municipalities in the region. While GVRD member municipalities come together to discuss what is best for the region overall, actual agreement of resource related concerns are seldom unanimous. Different interests may predominate at the municipal level. Each municipality in the GVRD, including Richmond and Burnaby, has voiced their support and agreement with the four strategies outlined in the LRSP and the values of environmental integrity and social equity are held by progressive planners and politicians. However, application of policy on the ground can have different motives and desired outcomes.

CRITERION 7: EXPAND COMMERCIAL TAX BASE

Unlike the tax mechanisms of the provincial and federal governments, local governments do not receive any portion of sales or income taxes, but raise their revenues, and finance local services, through property taxes. Although municipalities also generate revenue from grants, sales of services, the issuance of permits and licenses, and investment income, the large majority of municipal revenue is derived from property taxes. This reliance on property tax means that the land use decisions made by local municipalities directly impact municipal revenue.

Municipalities are keen to **expand the commercial tax base** because higher tax rates are assessed on commercial properties than on residential properties. The ability to raise revenues from commercial properties reduces the burden on the residential property owners who make up a substantial portion of the electorate. On average, across GVRD municipalities, light industry is taxed at four times the rate of residential and the business tax rate (under which office buildings fall) is three times the residential rate (Bish, 2003). In British Columbia tax rates are usually expressed as the dollars of tax levied per $1000 of assessed value; the following figures follow this convention . In Burnaby office uses are taxed at $25.80, a rate 3.7 times higher than the Burnaby residential rate. Burnaby's light industrial rate, $26.53, is only slightly higher than the business rate. In Richmond offices are taxed at 3.3 times the rate of

residential, at $23.37, while light industry is taxed at $26.88, 3.8 times the residential rate.

The higher rates assessed on commercial properties make it fiscally advantageous for a municipality to expand its commercial tax base. Relying relatively more on commercial properties enables municipalities to provide their residents services and amenities while keeping the residential taxes low. This approach to municipal financing is generally popular with voters. The risk of a municipally based property tax system that relies disproportionately on commercial property is that competition between municipalities will result. Municipal planners and politicians may feel pressured to accommodate business investors to prevent those investors from taking their business to an adjacent municipality.

One of the primary reasons that municipalities are permitting business parks is to expand their commercial tax base, thereby increasing their tax revenue and their ability to provide services to their residents. When asked about the benefits that business parks brought to the municipality, one local municipal planner didn't hesitate to list "tax base" as the number one benefit. Business parks are evaluated against the following question:

- Do business parks bolster a municipality's commercial property tax base?

This question is answered based on the assessment figures and taxes levied for office buildings in both business parks and town centres. The assessed value and taxes levied are expressed in relation to the amount of land occupied.

### CRITERION 8: LOCAL JOBS FOR LOCAL RESIDENTS

One important desire of municipal councils is to ensure adequate commercial activity to employ their residents. Providing l**ocal jobs for local residents** is often cited as a primary benefit of business park expansion. Whether the growth in business parks has provided jobs for residents located within the same municipality is the key indicator for this criterion.

The ratio between the number of jobs located within municipal boundaries and the size of the resident labour force (residents working or looking for work) demonstrate the extent to which a municipality imports or exports workers. This data from Statistics Canada is presented for Burnaby/New Westminster, Richmond, and, as a point of comparison, other areas of the region. Comparison of 1991 and 2001 Census data demonstrate any changes that have occurred over the same time period as the data on office space growth presented in Chapter Three.

## SUMMARY

Evaluating business parks against regional planning goals, sustainability principles, and specific municipal objectives provides insight into what business parks, as a prevalent land use trend, are contributing to the Vancouver region. Detailing the costs and benefits of business parks, particularly in comparison to locating office development in the regional town centres, draws out the value of this form of land use. The following table (Figure 12) is a summary of the evaluative framework that is applied to business parks in the subsequent chapter.

Figure 12 Evaluative Framework Summary

# 5 EVALUATION OF BUSINESS PARKS

The framework developed and summarized in the preceding chapter is used to evaluate business parks in this chapter. The explanation and rationale for each of eight criteria was established in the evaluative framework. In this chapter the key indicator(s) for each criterion are re-iterated and the data and analysis are presented.

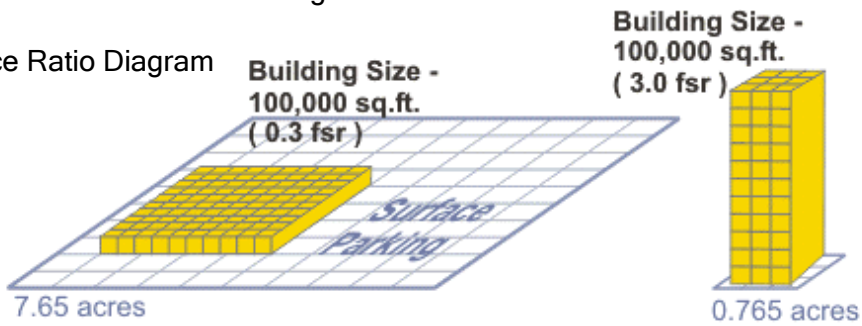
## ACHIEVE A COMPACT METROPOLITAN REGION

- Are business parks an efficient use of land?
- Do business parks contribute to achieving adequate employment densities in centres and transportation corridors supported by existing transit services?

The low density developments that make up business parks are a much less efficient use of land than the higher density towers that are constructed in urban centres. A typical business park has an FSR of 0.3 to 0.5. In Burnaby, office buildings in Metrotown Town Centre are allowed to 6.0 FSR. In the Richmond Town Centre densities for office buildings are permitted to reach 3.0 FSR (GVRD, 2003c). Higher densities allow more development on less land. For example, a 100,000 square foot

building in a centre with underground parking, at an FSR of 3.0, would consume 0.765 acres of land. In contrast, the same size building, 100,000 square feet, in a business park with surface parking, built at 0.3 FSR, would consume 7.65 acres of land (Figure 13). Building in centres consumes significantly less land, typically involves intensifying previously developed land, and increases the efficiency of existing infrastructure. In contrast, business parks are often constructed on undeveloped land and require extensive expansion of infrastructure and servicing.

Figure 13 Floor Space Ratio Diagram




Source: GVRD (http://www.gvrd.bc.ca/livablecentres/networkcentres.htm)

Almost seven million square feet of office space was constructed in business park settings between 1990 and 2000 (see Table 2 in Chapter Three). Assuming an average density of 0.3 to 0.5 FSR, these 6.7 million square feet of office space in new business parks have consumed between 310 and 517 acres of land. If this office space had been constructed in centres at an FSR of 3.0 only 52 acres of land would have been consumed. Built at an FSR of 6.0, 6.7 million square feet of space can be accommodated on less than 25 acres of land. If the total amount of office space in business parks more than doubles by 2021, as Royal LePage (2003) has predicted, between 1300 and 2100 acres of the regional land base will be business parks.

*There is currently 655,000 square feet of developed space in Glenlyon Business Park. At an average density of 0.34 FSR the eight buildings are spread across 44 acres. A few kilometers away in Metrotown, Metrotower I and Metrotower II together total 613,000 square feet. These two towers, built on air rights above the mall, accommodate almost exactly same amount of floor space on 0.6 acres.*

A significant proportion of the land in business parks is given over to surface parking. Business parks customarily provide 3.5-4 surface parking spots for every 1000 square feet of office space (NAIOP, 1986). The typical surface parking spot takes about 350 square feet of land, including its share of access lanes (Litman, 2004). Developments that provide 3 spots/1000 square feet have a 1:1 ratio of office space to parking space;

three surface parking spots take up 1,050 square feet of land. An office building of 100,000 square feet in a business park needs at least 2.4 acres for parking alone. In the Metropolitan Core or a regional town centre, structured parking would be provided below the building, thereby not consuming any additional land. In addition less parking is required because of greater use of alternative modes of transportation, as will be discussed in the following section.

In Glenlyon Business Park, where the average ratio is 3.7 spots per 1000, there are 2450 surface parking spots currently built. Based on the 350 square feet average, 20 acres of land have been consumed by parking in Glenlyon Business Park. To date, only a third of the Glenlyon development plan has been completed. The total build-out is scheduled to accommodate two million square feet of space. If the future developments provide parking at the same rate as the development to date we can expect 7500 surface parking spots in Glenlyon Business Park alone. These 7500 parking spots will consume over 60 acres of land.

INCREASE TRANSPORTATION CHOICE

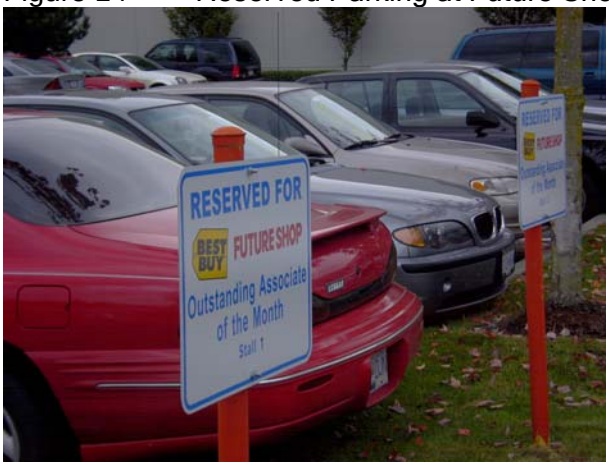
- Are business parks accessible by a range of transportation choices?
- Do business parks support a transit-oriented and automobile-restrained transportation system?

Almost without exception business parks are located along regional highways or major roads. One of the key market principles of selecting a location for a business park is access for people traveling by private car. Advertising for business parks features the quick drive times to important local destinations, such as the airport. [7] In Burnaby, business parks are located along Highway 1, Lougheed Highway, and Marine Way. In Richmond business parks cluster along Highways 91 and 99 and the Knight Street corridor. Surface parking, generally provided free to all employees, is one of the defining features of business parks and encourages and enables people to drive to work. In cases where the parking needs have been underestimated, firms work to find additional parking for their employees. At Future Shop's head office in Glenlyon Business Park demand for parking outstripped supply so an overflow lot was

[7] See, for example, http://www.glenlyonbusinesspark.com; http://www.campbellheights.ca

constructed on a nearby vacant site. There are special reserved spots by the front entrance of the building for the "outstanding associates of the month" (Figure 14).

Figure 14 Reserved Parking at Future Shop




Source: Photo by K. McMillan

It is possible for very determined transit riders or people with no other transportation options to access most business parks in Greater Vancouver by public transit. However, in most cases this involves a lengthy commute with at least one, if not two, transfers. Transit riders generally have to walk ¾ km or more from the stop to their work, often on streets with no sidewalks or along major roads with high speed traffic, heavy trucks, and no buffer between the pedestrian and the traffic. They may have to cross major arterials with no light or crosswalk. Transit dependent employees have little flexibility on when to arrive and depart work – service is often only provided at fifteen minutes intervals in the morning and afternoon on weekdays. It is very difficult to attract people to public transit when they must travel under conditions such as these in order to get to work.

*A young woman living in Richmond must take three buses and the SkyTrain to get to her office job in the Big Bend area of Burnaby. If all goes smoothly the trip takes her 1h15min, but each of her buses only runs every 15 minutes so missing one can add a significant wait. When asked if she's thought about buying a car she responded "I can't afford a car, what's that going to cost me, $400-500 a month?"*

*Public transit access to Glenlyon is limited. One bus route to and from Metrotown travels through Glenlyon during weekday peak hours, on fifteen minute headways. Outside of these times it is a fifteen minute walk to the nearest bus route. A third of this walk is along the gravel shoulder of Marine Way, a four lane highway, sign-posted at 80km/hour and part of the truck route.*

Figure 15 Crossing No. 6 Rd.

*Crestwood Corporate Centre is located off No. 6 Rd in Richmond, immediately south of the Hwy 91overpass. The 410, eastbound from Steveston via Richmond Centre and westbound from 22nd St. Station, operates from 6am to midnight, on 9-12min headways during peak hours. The closest stop to this Crestwood business park is north of the overpass on No. 6 Rd, although before 8am and between 3:30-6pm, one bus every 30min makes a detour and stops immediately outside the entrance.*

*There is no sidewalk on the east side of No 6 Rd, only a gravel shoulder. Although there is a pedestrian crosswalk 1/2km down the road at the entrance to Crestwood Corporate Centre, people getting off the bus must cross No. 6 Rd in order to get through the tunnel under Hwy 91. No 6 Rd is a major four lane road sign-posted at 60km/hour but traffic moves at closer to 80km/hour. The route is frequented by major trucks. Taking the bus to Crestwood Corporate Centre involves risking your life to get across this major road.*

*A man working in Crestwood walks more then 5km to work, over the heavily-trafficked Knight St. Bridge. He can't afford a car and walking saves him the $80/month transit pass.*

If you work in a business park it is almost impossible to walk to work. Business parks are located on industrial lands that are isolated from where people live. It takes an average person about 12-15 minutes to walk one kilometre. The number of people living within walking distance of business parks and town centres in Richmond and Burnaby is presented in Table 6. According to Statistics Canada, no one lives within ½ km of either Glenlyon or Crestwood, the two business park case studies in this research. Approximately 100 people live within 1km of Glenlyon and there is a population of 2,300 within 1km, a reasonable walk, of Crestwood. In comparison, approximately 28,000 people live within 1km of Kingsway and McKay, a central intersection in Metrotown. There are an estimated 14,200 people that live with walking distance (1km) of Richmond Town Centre. This means that if someone working in a business park wanted to live within walking distance of work it would be very difficult for them to do so because of the lack of housing close by. In contrast, there is a large amount of housing in close proximity to jobs that are based in the regional town centres in Burnaby and Richmond.

Table 6 Population Within Walking Distance of Business Parks and Town Centres

| Population | | | |
|---|---|---|---|
| | 500m | 1000m | 1500m |
| Business Parks: | | | |
| Glenlyon Business Park (Glenlyon Pkwy & N. Fraser Way) | - | 100 | 2,600 |
| Crestwood Corporate Centre (Knight St & Hwy 91) | - | 2,300 | 6,300 |
| Regional Town Centres: | | | |
| Metrotown (Kingsway & McKay) | 6,500 | 27,700 | 36,900 |
| Richmond Centre (No 3 Rd & Westminster Hwy) | 6,600 | 14,200 | 31,700 |

Source: GVRD (Statistics Canada, 2001 Census)
Notes: Populations rounded to the nearest 100th. Distance are based on 'crow-fly' distance.

Because business parks are located off major arterial roads designed to move heavy volumes of traffic, road access for cyclists is less than ideal. However, many of the newer business park developments have done a very good job of providing end-of-trip cycling facilities for their employees. Most of the buildings have a secure location for people to lock their bikes and also provide showers and locker rooms. One employee in a Richmond business park reported that his company even provided a free towel service for people who cycled to work. Evidence of cycle commuting may not be readily apparent because most people lock their bikes up inside their building, but on a summer day the four bike racks outside one of the buildings in Glenlyon Business Park were stacked with more than twenty bikes.

The impediments to accessing business parks locations by transit or walking are demonstrated in the mode split data collected by Statistics Canada.[8] The journey-to-work mode split data for people working in the region overall, and both centre and business park locations are presented in Table 7. About a quarter (24%) of people who work within the GVRD boundaries commute to work by transit, walking, or cycling while 76% of people commute by private vehicle. The use of alternative modes of transportation increases significantly for people who work in the Metropolitan Core. Slight more than half (54%) of people who work in the Downtown and Central Broadway area (the Core) get to work by car; 34% of people commute by transit and 12% walk or cycle to work. Metrotown also scores above the regional average in terms of workers commuting by sustainable modes of transportation. The mode split data for

[8] Mode split data is from 1996 Census as the 2001 Census fell during an extended disruption in public transit service as a result of a labour dispute.

people who work in business parks in the Vancouver region stands in dramatic contrast. This custom analysis by Statistics Canada demonstrates that, with a private vehicle share of 93%, less than 1 out of 10 people who work in both the Crestwood and Big Bend business park areas commute via a mode other than a private vehicle. Only 5% of these business park employees take transit to work and less than 2% walk or cycle to work.

Table 7 How Employees Get to Work (Journey to Work Mode Split, 1996)

| Place of Work | Private Vehicle Driver/Passenger | Transit | Walking and Cycling |
|---|---|---|---|
| GVRD Average | 76.2% | 15.2% | 8.7% |
| Urban Centres | | | |
| Metropolitan Core | 53.5% | 33.8% | 11.9% |
| RTCs Average | 81.7% | 10.6% | 7.0% |
| Metrotown | 70.2% | 20.7% | 8.6% |
| Richmond Centre | 84.9% | 9.0% | 5.6% |
| Business Parks | | | |
| Crestwood/Bridgeport | 93.0% | 4.9% | 1.9% |
| Big Bend | 93.0% | 5.1% | 1.3% |

Source: GVRD (1996 Census, Statistics Canada)

This data is corroborated by the findings of Douglas and Evans (1997), presented in Chapter Two, in their comparisons of the travel behaviour of employees working in the Central Business District, a suburban centre, a suburban office campus, and a suburban office/research park in the Washington D.C. area. Almost all employees (96%-97%) in the suburban office campus and park locations drive to work. In the suburban mixed-use transit centre, 82% of workers commute via car and in the CBD only 36% of employees get to work via private automobile. The mode shares of employees working in these locations are presented in Table 1 in Chapter Two.

The data from the Vancouver and Washington regions demonstrate that a high proportion of people will walk, cycle, and take transit to work when they can do so with relative ease. In particular, the design of a workplace environment is particularly important in determining mode choice for the journey to work. This finding is consistent with other research on urban form and journey to work travel choice (Frank & Chapman, 2004). When people work in locations that offer good accessibility by a range of transportation options more people will find it convenient to take transit, walk, or cycle to work.

The provision of free parking, an un-taxed benefit, is an economic incentive to drive (Shoup, 1997). Free parking, as shown in Figure 16, is a subsidy to car drivers and people who take transit or walk to work are not provided a comparable benefit. The influence of the availability of free parking on mode choice has long been established. In the 1970s the Canadian federal government discontinued the provision of free parking to some 40,000 civil servants. A major study of the shift in mode choice of federal government employees resulting from this change in parking pricing policy was sponsored by Transport Canada (Shoup and Pickrell, 1979). When the federal government began charging their employees for parking, the number of persons commuting by single occupant vehicle dropped by 21%. Transit increased by 16% and cycling and walking (together) increased by 7%. The new cost of parking was not simply absorbed by the higher paid employees, in fact, the Transport Canada study found that "the greatest diversion from singly occupied auto travel to carpooling and transit use occurred among males, younger persons, and higher income employees" (ibid:7). When former vehicle drivers were asked why they had switched to another mode of driving, two thirds cited the reduction in the parking subsidy they had previously enjoyed (ibid.).

Figure 16 Parking in Crestwood

Source: Photo by S. McMillan

Despite regional planning goals to reduce dependence on the single occupant vehicle, private vehicle ownership is increasing at a rate more than four times faster than population growth. In 2003 there were almost 1.3 million licensed vehicles in the GVRD, an increase of 4.6% over the previous year. In contrast, the population of the region is increasing at a rate of about 1.1% a year. Compared to 1994, the number of registered vehicles in the region has increased by 24% while the population has increased by 18% (GVRD, 2003b). On average, there are about 1.5 vehicles per household in the Vancouver region. This rises to above 1.7 vehicles for households that fall outside the Burrard Peninsula (ie: the GVRD excluding Vancouver, Burnaby, and New Westminster).

The need to commute to work by car often requires that a household buy a second car. One employee in a Richmond Business park works for a firm that was previously located near Brentwood Town Centre in Burnaby. Whereas he previously cycled to work from his home in North Vancouver, when his company relocated to Richmond he had to buy a second car in order to get to work. Another employee based in the same business park tried taking transit to work when he first started working at this location, but he found the commute so long and frustrating his wife and he eventually bought a second car so he could drive to work. Once the costs of owning a car have already been assumed, the marginal costs of driving the car are perceived as negligible (Frank, 2004). On a trip-by-trip basis people tend to consider only the direct out-of-pocket expenses. If the trip destination has free parking available driving seems "free" compared to the cost of transit fare. Owning a car for work can also lead to increased usage of the car for non-work trips.

Future growth of offices in locations that most people must access via single occupancy vehicle has significant implications for future congestion in the region. While current vehicular access is of utmost importance to business park tenants, according to Royal LePage, most tenants don't consider long-term access:

> Business park office tenants tend not to be concerned with the problem of future traffic congestion. Traffic congestion is a longer-term problem, which does not impact current location decisions, which tend to have a maximum 10 to 15 year time horizon. As renters, office tenants are free to move closer to transit only after congestion becomes a serious problem and it has not reached that stage (2001:35).

A comment that surfaced several times in the course of researching this project was that the people who work in business parks will drive to work, regardless of where their jobs are located. When asked about his perception of transportation access to business parks a local real estate broker said:

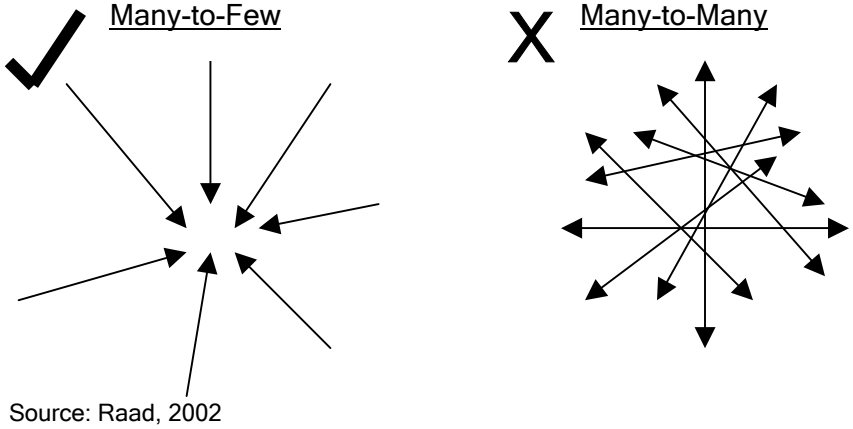
> *The types of people working in business parks are never going to take transit. They're all young guys making $100,000 a year and it's a pipe dream to think they're going to take the bus.*

It is certainly true that some people will always want or need to drive to work. However there are two false assumptions behind the perception expressed above. First, as will be discussed below in the section on social equity, not everyone who works in business

parks has a high income. Second, it is clear from the mode split data of people who work in centres that, under the right conditions, higher income earners will commute by public transit. In their research on travel behaviour of employees in four different types of locations Douglas and Evans (1997) found that the employment mix, in terms of occupation category, was quite similar in each of the locations yet widely different travel patterns emerge in these locations.

It is not economical to provide transit service to all origins and destinations. Transit is most viable in dense corridors and nodes where passenger volumes are sufficient to warrant high service levels. Transit can effectively and efficiently support regional transportation patterns of origins and destinations that reflect a "many-to-few" model, where there are many origins but only a few concentrated destinations. Transit is not able to function optimally when origins and destinations are widely dispersed in a "many-to-many" pattern (Raad, 2002). This is illustrated in Figure 17. Transportation patterns in Vancouver increasingly resemble a "many-to-many" pattern as employment is increasingly dispersed in business park locations. Focusing office development in low-density, dispersed locations undermines the existing transit infrastructure that serves the regional town centres and the metropolitan core. In many locations, public investment in transit is underutilized while the owners and tenants of business parks pressure the transportation authority to improve service to their location.

Figure 17 What Travel Patterns Can Transit Accommodate Economically?




Source: Raad, 2002

BUILD COMPLETE COMMUNITIES

- Are business parks integrated locations where people can live, shop and access services?
- Does the expansion of business parks contribute to the development of the regional town centres?

Aside from the odd coffee or sandwich shop, business parks are entirely locations of work. There are no shops or services, not even a corner store. Employees working in most business parks cannot buy a magazine or a pack of cigarettes without driving off-site. They can't take in their dry-cleaning, go to a bank machine, buy toothpaste, or refill their prescription on their lunch break. The lack of nearby amenities was mentioned in many of the interviews with people working in business parks.

> *"I used to work downtown, which I liked. There were things around; I could go to the theatre, to shops"*
>
> *"The only thing to do here is to walk around"*
>
> *"The location is okay, but I wish there was more to walk to, to shops, restaurants"*
>
> *"This location is close to where I live, but it isn't close to other things. At least a couple of times a week I drive to (a nearby strip mall)"*
>
> *"It's very inconvenient – no services or stores, there is not even a corner store. You have to drive if you need to get something"*

Not everyone is concerned about the ability to do errands during the day.

> *"I do my errands on the weekend"*
>
> *"I always bring my own lunch, so I never leave during the day"*
>
> *"I only take 30 minutes for lunch, so I never do errands at lunchtime"*
>
> *"Sometimes I drive to do errands, but we have a really nice canteen in the building"*

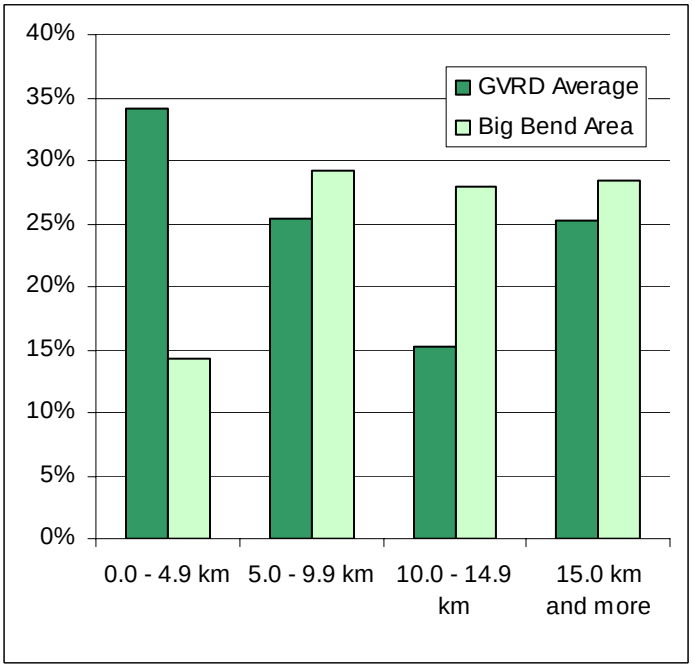
Business parks are not locations where people can shop, play, or access services.

| Table 8 Work Commute Distance, by Work Location | | | | | | |
|---|---|---|---|---|---|---|
| | | Urban Centres | | | Business Parks | |
| | Greater Vancouver | Vancouver Core | Metrotown | Richmond Centre | Crestwood Bridgeport | Big Bend |
| Median Distance (km) | 7.8 | 7.1 | 7.9 | 5.4 | 10.1 | 10.9 |
| 0.0 - 4.9 km | 34% | 36% | 31% | 47% | 15% | 14% |
| 5.0 - 9.9 km | 25% | 27% | 26% | 18% | 35% | 29% |
| 10.0 - 14.9 km | 15% | 11% | 23% | 13% | 20% | 28% |
| 15.0 km and more | 25% | 26% | 20% | 22% | 31% | 28% |
| Source: GVRD (Statistics Canada, 2001 Census) | | | | | | |

One argument often presented in favour of suburban business parks is that they are located closer to where people live. The theory is that by moving jobs out to the suburbs people will not have to commute as far to work. The data for the Vancouver region, presented in Table 8, does not support this point of view. Statistics Canada 2001 Census data demonstrate that, on average, people working in the GVRD commute 7.8km, each way. People working in the urban centre locations of the Core, Metrotown, and Richmond Centre commute, on average, between 5.4km and 7.9km each way. Employees based in business parks travel significantly further to work. Workers in the Big Bend area of Burnaby commute an average of 10.9km each way, 38% further than people working in Metrotown. People working in the business parks in the Crestwood area of Richmond have an average one-way commute of 10.1km, 87% farther than people who work in Richmond Centre. [9] People working in business parks have a one-way commute of 30%-40% longer than the regional average. On average, over a third of people working within the boundaries of the GVRD commute less than 5km to work (Table 8; Figure 18). In contrast, only 14% of people working in the Big Bend area and 15% of Crestwood workers live within 5km of work. The difference is that while some people are certainly commuting long distances to downtown, there are significant opportunities to live within a few kilometers of the jobs based in the Metropolitan Core.

[9] The actual distance traveled is likely further as this figure is determined by the straight line "crow-fly" distance between respondent's work and home locations.

Figure 18 Journey to Work Commuting Distance, by Work Location




Rather than supporting the regional town centres, business parks pull investment and activity away from the centres. Locating offices in centres helps create synergies; workers support local businesses, cultural services, and enable amenity improvements that benefit local residents. When offices locate in business parks the opportunity for these office employees to support the regional town centre is lost. Significant public investment has been made in the regional town centres. They are locations of libraries, community centres, municipal halls, college campuses, museums, hospitals and courts. When private business investment is directed to areas outside of these locations the opportunity to further develop and improve the town centres is lost and a location competing for municipal and regional attention and investment is created.

Business parks do not support the shared objective of building complete communities on two fronts. First, focusing office development in business parks and not in town centres undermines the potential of and significant investment in the town centres. Second, as single use developments in relatively isolated locations business parks are not communities where people can live, work, shop, and play without having to travel long distances to do so.

## PROTECT THE GREEN ZONE

There is a finite amount of land available for development in Greater Vancouver. Two thirds of the land base of the region has been set aside, to be protected from development, as the Green Zone. To date, business parks in the Vancouver region

have generally located on industrial land and not on land within the Green Zone. While business parks have not directly consumed Green Zone land, their proliferation can create indirect pressure. As the land outside of the Green Zone becomes developed there is increasing pressure to allow development on land within the Green Zone. When land is used inefficiently, as in the case of business parks, the pace of land consumption is quickened and the pressure on the Green Zone increases. Ron Bagan, Executive Managing Director of Colliers International, Western Division, is concerned that municipalities are "jumping on the high-tech bandwagon and think that all industrial land is going to be office" and, as a result, there is a lack of industrial land available for light industry (Bagan, 2004). A shortage of land available for industrial uses will likely prompt requests for land to be removed from the Agricultural Land Reserve and increase pressure on the Green Zone. As industrial land in the middle ring suburbs is being consumed by office buildings in business parks, industrial users are being forced to locate farther afield, thereby extending the urban/rural boundary and commuter shed. However, if offices are located in high-density towers in mixed-use centres and the industrial land supply is preserved for industrial uses, pressure to develop the Green Zone is mitigated.

### IMPROVE ENVIRONMENTAL INTEGRITY

At a localized level business parks may improve the environmental integrity of the specific site and immediate area around the site. Business parks are located on brownfield sites that may have been contaminated by previous uses. Prior to construction the site remediation may be required of the developer. Business parks may replace less pleasant uses and, through landscaping, site remediation, and restoration of natural amenities such as waterways and foreshore areas, business park developments can improve the site and the natural environment. Activities and uses that are contained within closed buildings are less offensive to people living near or passing by the site. For some employees, a business park setting can be a very pleasant environment in which to work.

> *"It is a nice place, grounds are really nice, and it is quiet, pretty in the summer"*
>
> *"It is quieter, laid back, not so rushed as it is downtown"*

*"It is very spacious, clean, tidy, well maintained. You can go for walks. I really like the quiet environment"*

*"I like it here in the summer but not in the winter. It is very dreary in the winter"*

At a regional level, business parks have negative impacts on environmental integrity because of the transportation patterns that result from this form of land use. Motor vehicles are the main contributing source of air pollution in the region. Poor air quality has a detrimental affect on both personal and public health, and is particularly threatening for people with asthma, the elderly and other people with suppressed immune systems. Elevated exposure to carbon monoxide can reduce the ability of the blood to carry oxygen to the heart, brain, and other tissues, resulting in impaired performance, respiratory failure, and death. The GVRD, together with the Fraser Valley Regional District (FVRD) and Whatcom County, produce an Emissions Inventory for the Lower Fraser Valley Airshed. The following statistics are for the Canadian portion of the Lower Fraser Valley (CLFV) Airshed, which encompasses virtually the entire GVRD as well as the south-western portion of the FVRD.

Cars and light trucks contribute 69% of carbon monoxide (CO) emissions to the CLFV. Cars and light trucks are also the largest source of "smog-forming pollutants", the major pollutants which contribute to the production of ground-level ozone (a key constituent of smog) and particulate matter. These contaminants also impair visibility. Almost a quarter (24%) of the pollutants that result in smog, namely Nitrogen Oxides (NOx), Volatile Organic Compounds (VOCs), Sulphur Oxides (SOx), Particulate Matter$_{2.5}$, and Ammonia ($NH_3$), are produced by cars and light trucks. As locations that heavily favour private automobile usage and present significant impediments to alternative modes of transportation, business parks are hindering efforts to improve air quality in the region.

At a global level, business parks contribute to environmental degradation because of the heavy reliance on private vehicle travel of people commuting to these workplaces. Greenhouse gas (GHG) emissions are the major cause of climate change. The transportation sector is by far the largest single source of GHG emissions, accounting for about 40% of British Columbia's emissions. In the GVRD 27% of GHG emissions come from light duty vehicles. These private vehicles and small trucks, such as SUVs, are the single greatest contributor of GHGs in the region. Functioning like a

greenhouse, gases such as carbon dioxide, methane, nitrous oxide and CFCs (chlorofluorocarbons) trap heat in the atmosphere by allowing the sun's heat to pass through and warm the earth but prevent the warmth from escaping. This raises the global temperature thereby spurring climate change. The average Canadian produces 23.6 tonnes of GHGs per year, four times the global average. GHG emissions in Greater Vancouver have increased steadily in recent years. Any gains in fuel efficiency have been offset by the increase in the total vehicle kilometers traveled due to more cars on the road and the separation and decentralization of land uses.

"Green Buildings" represent a new approach to building construction and design that focuses on reducing energy consumption, greenhouse gas emissions, raw materials, waste output, and water consumption. Ensuring new buildings are as "green" as possible is an important part of promoting environmental integrity. However, given that transportation contributes so significantly to fossil fuel consumption and GHG emissions, a "green location" can realize much greater energy savings and GHG reductions than can a green building.

Table 9 compares the annual GHG emissions of a standard office building and a new "green" office building. Comparisons are made for both buildings in a business park location and in a regional town centre location. A building of 50,000 square feet and 200 employees are assumed in each case. The building related GHG emissions are 50

Table 9 Total Annual GHG Emissions by Location

| | Regional Town Centre | | Business Park | |
|---|---|---|---|---|
| | **Standard Building** | **Green Building** | **Standard Building** | **Green Building** |
| Commute Distance (kms, round trip) | 16 | 16 | 22 | 22 |
| Commute Modal Split | | | | |
| Single Occupant Vehicle | 64% | 64% | 87% | 87% |
| Car Pool (2 people) | 7% | 7% | 6% | 6% |
| Transit | 21% | 21% | 5% | 5% |
| Walk/Bike | 9% | 9% | 1% | 1% |
| Employee Transportation-Related GHG Emissions (tonnes) | **159** | **159** | **291** | **291** |
| Building GHG Emissions (tonnes) | **50** | **25** | **50** | **25** |
| **Total GHG Emissions (tonnes)** | **209** | **184** | **341** | **316** |

Source: GVRD Policy and Planning Dept
Notes: Modal split and commute distance based on Metrotown (for RTC) and Big Bend (for business park). Standard building, 50,000 sq. ft./200 employees; A new green building produces 50% fewer GHGs than a standard building; A standard building with minor retrofit produces 10% less GHGs

tonnes for standard office building and 25 tonnes for a green building. The transportation-generated GHG emissions are calculated based on the average mode split and round-trip commute distance achieved in each location.

With a much higher dependence on private vehicles, a business park location produces 83% more transportation-related GHG emissions. Significant reductions in GHG emissions are achieved by the greater usage of alternative modes of transportation and shorter commute distances in urban centres. Comparing a standard building to a green building in a business park, GHG emissions are only lower by 7%. A green building in a business park produces 51% more GHG emissions than a standard building in a town centre.

PROMOTE SOCIAL EQUITY

- Are jobs in business parks accessible by people in all socio-economic strata or do lower-income and traditionally marginalized people have a disproportionate burden in accessing employment in business parks?

Locating employment in places that are only accessible by car is exclusionary to low-income people and families that do not have the means to purchase a car. Despite the perception that all jobs in business parks are high-tech jobs for highly paid professionals, firms in business parks have in-house cafeterias, security, cleaning staff, junior secretaries, receptionists and mail-room clerks and employ people at all income ranges. Some business park tenants have a higher proportion of lower paid employees because their operations include call, dispatch, or telephone support centres. A single mother, working in Glenlyon Business Park lives with her elementary-school aged son in an apartment building by a SkyTrain station:

> *"I used to own a car and but then I was in an accident and I can't afford to replace the car. I'd like a car because it would be a lot faster to get to work but now I take the bus. If I work late, past 6:30pm, or if I have to get to my son during the day, then I have to walk to Marine Drive [15 min] or take a cab to Metrotown, which costs $10."*

Cleaners, cooks, and security often work shifts that start and/or end very late or very early. The bus that services Glenlyon Business Park only operates during peak hours

but even the regular bus that stops within a 15 minute walk of Glenlyon ceases running too early in the evening for this young man to get to work:

> *"I work security on the Midnight-8am shift. I don't have a car, so I take a bus to Metrotown Station but the bus stops running before Midnight so I either ride my bike the rest of the way or take a cab from Metrotown. That costs me about $10".*

A typical family spends 15-percent or more of its annual household budget on motor vehicle-related expenses. The Canadian Automobile Association estimates that in 2004 the average cost of owning and operating a private vehicle is $9,000 - $10,000 a year. These estimates are based on the average ownership and operating costs of a Chevrolet Cavalier and a Dodge Caravan. Assumptions include: 18,000km driven annually, average insurance, and a loan at 7.25% interest with 10% down payment. This translates into a monthly expenditure of $750 to $833. Looking at operating costs alone (fuel, maintenance, tires), the CAA estimates that it costs about $2200 a year, or $183/month to run a car. This estimate is based on gas costing 74.4 cents/litre. With recent gas costs as high as or higher than 90 cents/litre operating costs have increased to a least an average of $2500/year or $208/month.

In comparison, a three zone transit pass, which provides unlimited access to everywhere in Greater Vancouver, is $120/month. People traveling only two zones pay $87/month and within one zone the cost is $63/month. Walking, cycling or taking transit to work can save a person thousands of dollars a year, compared to owning a car in order to get to work.

Companies and organizations that chose to locate in a business park over an urban centre because they have determined that it will save the firm money are, in effect, downloading costs to their employees. This was well understood by one business park employee.

> *"Our company used to be located in a more central place and here it is costing them way less per square foot, but they've offloaded the costs to their employees. It costs $7000 a year to run a car. But, most people don't realize the company is doing this. This location is good for business but not for the workers. Why does the city allow this?"*

Business park employees that do manage to take transit to work pay with their time. The extra time it takes to access remote locations by public transit is time away from

families, friends, household responsibilities and leisure. The level of service that is feasible to provide to these locations means that business park transit users are often severely restricted in their options of when to come and go, and which routes they must take. Transit users must often cut across parking lots, run across busy streets, and walk along roads with no sidewalks. The environment within a business park may be nicely landscaped, but the surrounding context is usually dangerous and unpleasant as pedestrians and transit users walk along the sides of heavily-traveled roads.

## EXPAND COMMERCIAL TAX BASE

- Do business parks bolster a municipality's commercial property tax base?

Office buildings are taxed at the same rate per $1000 of assessed value regardless of their location within a municipality. Table 10 presents the assessments and taxes levied for two office buildings in Burnaby of comparable size, constructed within a few years of each other. One of the buildings is located in Metrotown (FSR=3.9) and the other is located in a business park in the Big Bend area (FSR=0.34).

Table 10 Assessed Values and Taxes Levied, Metrotown vs. Glenlyon

| | Metrotown<br>4555 Kingsway | Glenlyon<br>8800 Glenlyon Pkwy |
|---|---|---|
| **Site and Building Size** | | |
| Building Square Footage | 159,860 | 120,150 |
| Site Square Footage | 40,736 | 355,667 |
| Site Acres | 0.935 | 8.165 |
| **Assessed Value 2004** | | |
| Gross Land | $ 4,370,000 | $ 3,201,000 |
| Gross Improvements | $ 24,248,000 | $ 8,793,000 |
| Net Assessed | $ 28,608,000 | $ 11,984,000 |
| Land per Square Foot | $ 107.28 | $ 9.00 |
| Improvements per Square Foot | $ 151.68 | $ 73.18 |
| **Taxes Levied 2004** | | |
| Tax Levy | $ 737,952 | $ 309,131 |
| Taxes per Building Square Foot | $ 4.62 | $ 2.57 |
| Taxes per Site Square Foot | $ 18.12 | $ 0.87 |

Source: City of Burnaby; BC Assessment Authority

Although both these buildings are taxed at the same rate, the Metrotown building generates more than twice as much tax revenue for the City of Burnaby; $737,952 compared to $309,131. The Metrotown land is assessed at $107 per square foot, compared to only $9 per square foot of land in Glenlyon. The building in Metrotown is assessed at $152 per square foot of space, compared to $73 per square foot in Glenlyon. Most telling is the taxes levied per square foot of land. For every square foot of land this building occupies in Metrotown, $18 of tax revenue is generated for the municipality and other taxing authorities. In contrast, only 87cents is generated per square foot of land in Glenlyon Business Park.

Statistics on site and building size, assessment values, and taxes levied can be found for twelve additional sample buildings in Burnaby in Appendix B. A selection of recently developed buildings was chosen from different areas in Burnaby to illustrate the tax revenue that is typically generated from buildings in Metrotown compared to buildings in business parks. The tax revenue generated from land used for office buildings in Burnaby ranges dramatically. The taxes paid per square foot of land on the four office buildings examined in Metrotown range from $7 to $122. The largest building in Burnaby, Metrotower II, is built on air rights above the mall in Metrotown. Using the typical floor size as a proxy for the land occupied, this building generates $122 of tax revenue per square foot of land for the municipality. At the other end of the spectrum is the building occupied by MacDonald's Restaurants at 4400 Still Creek Dr. Occupying 4.2 acres of land, the owners pay only 80cents of tax per square foot of land. The taxes paid per square foot of land on the ten business park sites examined in Burnaby range from $0.80 to $4.51, with an average of $1.90.

A similar situation is found in Richmond. The data in Table 11 compare a building in Crestwood Corporate Centre with one of comparable size in Richmond Town Centre. The buildings were constructed within a year of each other. The building in the town centre generates 1.5 times more tax revenue for the municipality than the building in the business park. Both the land and the improvements of the town centre building are assessed at a high rate. In turn, this produces a much higher return on the land; land in the business park only generates $1.11 per square foot whereas in Richmond Town Centre $5.75 of tax revenue is collected per square foot of land.

Table 11 Assessed Values and Taxes Levied, Richmond Centre vs. Crestwood

| | Richmond Centre 5811 Cooney Rd | Crestwood 13511 Commerce Pkwy |
|---|---|---|
| **Site and Building Size** | | |
| Building Square Footage | 109,374 | 96,835 |
| Site Square Footage | 58,879 | 196,280 |
| Site Acres | 1.35 | 4.51 |
| **Assessed Value 2004** | | |
| Gross Land | $ 4,117,000 | $ 2,932,000 |
| Gross Improvements | $ 10,313,000 | $ 6,390,000 |
| Net Assessed | $ 14,430,000 | $ 9,312,000 |
| Land per Square Foot | $ 69.92 | $ 14.94 |
| Improvements per Square Foot | $ 94.29 | $ 65.99 |
| **Taxes Levied 2004** | | |
| Tax Levy | $ 338,487 | $ 218,679 |
| Taxes per Building Square Foot | $ 3.09 | $ 2.26 |
| Taxes per Site Square Foot | $ 5.75 | $ 1.11 |

Source: City of Richmond; BC Assessment Authority

The site details, assessed values, and taxes levied for twelve Richmond office buildings are presented in Appendix C. The taxes generated for land consumed by business parks in Richmond range from $0.95/square foot to $1.68/square foot. In the town centre between $2.55 and $5.75 is generated per square foot of land.

As industrial land is being given over to office uses it is informative to compare the tax revenue generated from office buildings in business parks compared to light industrial uses in these locations. There is a 3% difference between the light industrial and business (office) tax rates in the City of Burnaby; light industrial uses are taxed at $26.53 per $1000 of value and business uses are taxed at $25.80 per $1000. The first Ballard Power building (Figure 19) located at 9000 Glenlyon Parkway in Glenlyon

Figure 19 Ballard Power


Source: Photo by K. McMillan

Business Park provides a good illustration of the different amounts of tax revenue that are generated from office buildings in business parks compared to light industrial uses in business parks. The BC Assessment Authority classes 45% of the land value under the light industrial category and 55% under the business (office) category. The same proportions are applied to the building square footage and site size. Table 12 presents the site details, assessment values, and taxes levied for the building, which is taxed under two categories.

The light industrial portion of the Ballard site and building generates 17% ($28,027) more tax revenue than the office portion, even though light industry only represents 45% of the use. Expressed per square footage of land, $1.24 of tax revenue is garnered for every square foot of land use for light industry compared to only $0.87 per square foot of land used for office. In sum, keeping the land for industrial use rather than allowing office development would result in 43% more tax revenue for the City of Burnaby.

Table 12 Assessed Values and Taxes Levied, Industrial vs Office

| | Ballard 1<br>9000 Glenlyon Parkway | |
|---|---|---|
| | Light Industrial | Office |
| **Site and Building Size** | | |
| Building Square Footage | 49,458 | 60,449 |
| Site Square Footage | 157,858 | 192,938 |
| Site Acres | 3.6 | 4.4 |
| **Assessed Value 2004** | | |
| Gross Land | $ 1,453,000 | $ 1,823,000 |
| Gross Improvements | $ 5,936,000 | $ 4,680,000 |
| Net Assessed | $ 7,379,000 | $ 6,503,000 |
| Land per Square Foot | $ 9.20 | $ 9.45 |
| Improvements per Square Foot | $ 120.02 | $ 77.42 |
| **Taxes Levied 2004** | | |
| Tax Levy | $ 195,774 | $ 167,747 |
| Taxes per Building Square Foot | $ 3.96 | $ 2.78 |
| Taxes per Site Square Foot | $ 1.24 | $ 0.87 |

Source: City of Burnaby; BC Assessment Authority

In both Richmond and Burnaby there are more office buildings in business parks than in town centres and therefore the total taxes generated from business park office development likely surpasses the taxes from office buildings in centres. However, this

analysis demonstrates that there is a significant opportunity cost accrued when municipalities allow office buildings in industrial land rather than diverting them to the town centres. Because the land and improvements in centres are assessed at higher values than the land and improvements in business parks, office buildings in town centres generate relatively more tax revenue than do office buildings in business parks. Christopher Leinberger, a leading new urbanist finance theorist, contends that investing in urban areas provides a much higher return on investment over the long term than do conventional suburban developments. While there is an initial gap of several years when suburban development returns are greater, urban developments soon surpass and then greatly exceed suburban projects (Urban Land, 2003). In additional there is an opportunity cost when industrial land is used for office and not for industrial uses. The example of the Ballard building demonstrates that the City of Burnaby receives 43% more in tax revenue for land that is used for industrial purposes compared to the land that is given over to office buildings.

Some might suggest that the comparison to the regional town centres is a false one because the companies locating in business parks would not locate in an urban setting. The argument is that the choice for municipalities is between allowing business parks and seeing those firms locate in other municipalities or other regions. While it is clear that segments of the office market are interested in business park settings there has not, to my knowledge, been any comprehensive analysis of the proportion of that market that would choose to locate elsewhere were a business park opportunity not available. Business parks are one element of a broader economic landscape. Office location decisions, whether a firm is deciding upon a country, province, metropolitan area or a location within a city, is a complex process influenced by a number of factors (Schmenner, 1982). Linda Thorstad (2004), Executive Director, Vancouver Economic Development Commission, contends that office infrastructure is just one element of what creates a vibrant economy, and is of much less importance than other factors such as labour force requirements and a competitive business environment. The ability to locate offices in business parks is not the driving factor bringing investment to the region.

Richard Florida, in *The Rise of the Creative Class*, argues that creative people are the engine of economic growth in the postmodern economy. In his words, “access to

talented and creative people is to modern business what access to coal and iron ore was to steelmaking" (2002:6). The metropolitan regions that attract the Creative Class, artists, engineers, scientists, designers, writers, and lawyers, become the "economic winners of our age" (ibid:218).

> The Creative Centers are not thriving for such traditional economic reasons as access to natural resources or transportation routes. Nor are they thriving because their local governments have given away the store through tax breaks and other incentives to lure business. They are succeeding largely because creative people want to live there. The companies then follow the people – or, in many cases, are started by them. Creative centres provide the integrated eco-system or habitat where all forms of creativity – artistic and cultural, technological and economic – can take root and flourish (Florida, 2002:218).

## LOCAL JOBS FOR LOCAL RESIDENTS

It is clearly the case that the growth in business parks in the 1990s is correlated to a substantial growth in jobs. Between 1991 and 2001 the total number of jobs in Burnaby grew by almost 28,000 while the number of jobs in Richmond increased by almost 32,000. The first three columns of Table 13 list the total number of jobs in 1991, 2001, and the difference between these two years. Over the same period of time, the labour force (those residents who are working or looking for work) also increased in each of these areas of the region, but not as substantially as the number of jobs. The jobs to labour force ratio is presented in the bottom half Table 13; in both Richmond and Burnaby the number of jobs per local resident in the labour force increased.

Table 13 Jobs to Labour Force, Burnaby and Richmond

| | Total Jobs | | | Labour Force | | |
|---|---|---|---|---|---|---|
| | 1991 | 2001 | Change | 1991 | 2001 | Change |
| Burnaby | 93,655 | 119,950 | 26,295 | 81,465 | 92,170 | 10,705 |
| Richmond | 85,990 | 117,475 | 31,485 | 66,475 | 79,510 | 13,035 |
| | | | | | | |
| | Jobs to Labour Force Ratio | | % of Jobs Held by Local Labour Force | | % of Local LF who Work in Local Area | |
| | 1991 | 2001 | 1991 | 2001 | 1991 | 2001 |
| Burnaby | 1.15 | 1.30 | 31% | 27% | 35% | 35% |
| Richmond | 1.29 | 1.48 | 41% | 37% | 53% | 54% |

Source: GVRD, 2003b

The majority of the new jobs in these areas were not taken up by local workers. An increase in the jobs to labour force ratio, as experienced in each of these regions, does not necessarily mean that more people are working and living in the same municipality. In Richmond, the proportion of local jobs held by residents living within the same municipalities declined from 1991 to 2001. In Burnaby this percentage held constant at 35% Had most of the new jobs been occupied by people living in the local area the proportion of the local labour force working in the local area would have increased. In Burnaby, more than seven out of every ten jobs in the municipality are held by people living in another municipality – only 27% of local jobs are held by local residents. A higher proportion (37%) of local jobs in Richmond is held by local residents.

The municipal and regional perspectives on achieving a good jobs/labour force balance are somewhat different. From a municipal perspective the objective is to increase the number of jobs within the municipal boundaries thereby creating more jobs to be taken up by local residents. From the regional perspective a good jobs/labour force balance entails locating jobs in places that are accessible by a variety of modes of transportation from where workers live. Ensuring that as many jobs as possible are accessible by transit, or within walking distance of residential areas, is part of building complete communities and increasing transportation choice. When a municipality tries to capture as many jobs as possible and locates these jobs in auto-dependent business parks regional mobility and the principle of job accessibility is compromised. As discussed in the Build Complete Communities section, workers in business parks commute significantly farther than the regional average. Employees based in the Big Bend area of Burnaby (the location of Glenlyon Business Park and others) have a one-way, 'crow-fly', commute distance of 10.9km. This is 40% farther than the regional average of 7.8km.

# 6 CONCLUSIONS AND RECOMMENDATIONS

This evaluation of business parks as a contemporary land use trend in the Vancouver region has explored three primary research questions:

1. Is business park development consistent with the regional planning goals set out in the *Livable Region Strategic Plan*?
2. Are business parks in tune with the principles of sustainability?
3. Are business parks fulfilling municipal economic objectives?

Eight specific criteria, each with one or two key indicators, formed the framework for answering these questions. A variety of measures, qualitative, quantitative, and analytical, were applied to this framework. It was found that, in comparison to the regional town centres, the development of business parks is not consistent with any of the eight criteria set out in the evaluative framework.

The impacts of business parks are in stark contrast to the vision and goals set out in the LRSP. Business parks are an inefficient use of land consuming significant amounts of land for parking and low-rise buildings, therefore making the region less compact. In a typical business park there is a 1:1 relationship between land consumed for parking and building floor space. The location, urban form, urban design, and parking supply of business parks produce unsustainable travel patterns, heavily reliant on single occupant vehicle travel with little use and choice of alternative modes of transportation. 93% of business park employees commute via private automobile; only 5% take transit and less than 2% walk or cycle to work. As single-use locations that are isolated and not connected to other urban areas, business parks hinder the development of complete communities. By drawing office uses away from urban centres, business parks undermine the ability of the regional town centres to become truly complete communities. Business parks are not closer to where people live; in fact, they are farther. People working in business parks have a one-way commute 30%-40% longer than the regional average. While, to date, business park development has occurred on land designated for industrial use, the location and form of business parks poses a threat to the continued preservation of the Green Zone.

The second question posed in this thesis explicitly addresses the issue of environmental and social sustainability. These principles can be seen as part of the end result towards which the LRSP is working. The concept of environmental integrity was examined from a site specific, regional, and global perspective. Business park development can create the opportunity to remediate and improve polluted and unpleasant sites. Landscaping and site design can be done to ameliorate the natural environment by, for example, restoring streams and using indigenous plants. However, the environmental impacts at a regional level are not positive; the transportation patterns produced by business parks degrade the air quality in the region, thereby compromising the health of local residents. At a global level these transportation impacts, through the release of greenhouse gases, seriously threaten the stability of the global climate. Compared to a town centre location, employees commuting to a business park generate 82% more transportation-related greenhouse gas emissions. Reducing dependence on private automobiles is a necessity in order to address the issues of air pollution, road congestion, and the significant public costs, both financial and health, that result from a growing population and high levels of automobile use.

Municipalities have specific economic objectives they are trying to meet through permitting and promoting business parks. However, the examination of assessment values and taxes levied reveals that business parks represent a significant opportunity cost to the municipalities. Rather than maximizing the use of their land base, municipalities are almost 'giving away the land for free' as the tax revenues generated from the properties are very low. In comparison, office buildings in town centres generate significantly more tax revenue for the municipality. While there are a substantial number of jobs in business parks in the region, these jobs are not necessarily held by local residents. The situation is thus: in permitting business parks, municipalities are undermining their town centres, increasing the congestion on their roads, and incurring opportunity costs of lost tax revenue, in order to attract jobs that are held by people living in other municipalities.

The following section outlines recommendations that follow from the findings in this research. These recommendations are addressed to the three governing bodies in the province; the provincial government, the GVRD, and the local municipalities.

The *Livable Region Strategic Plan* has been confirmed by the Provincial Legislature as a growth management strategy that "promote[s] human settlement that is socially, economically and environmentally healthy and that makes efficient use of public facilities and services, land and other resources " (BC Legislature, 1995:942.11). The four principle goals of the LRSP are consistent with this mandate. This thesis demonstrates that business parks, a growing phenomenon in the Vancouver region, are counter-productive to achieving these goals and, therefore, to the legislation adopted by the Province. The Provincial Government should reconfirm its support for the Growth Management Act and demonstrate that it is willing to intervene to ensure that the major metropolitan region in British Columbia is developed in accordance with the regional and provincial growth management strategy.

While regional bodies have no authority over the land use decisions necessary to implement regional plans, it is unlikely there is the appetite in the current Provincial government to overhaul the regional governance structure. The Province, together with the GVRD and its member municipalities, need to consider ways in which the

implementation of the regional growth management strategy can be better coordinated without substantially diminishing the authority of local government. Business parks are clearly in violation of regional goals and sustainability principles, but curbing their development must be done by a partnership of municipalities acting together. Business parks represent a modern-day "tragedy of the commons" (Hardin, 1968). Without better management and protection of our collective interests, in the pursuit of self-maximization, the future social, environmental, and economic well-being of this region and province will be compromised.

A number of recommendations for the GVRD emerge from this research. The threat to regional sustainability, livability, and quality of life created by business parks is not because the regional goals and vision are leading the Vancouver region astray. The four strategies of the LRSP and the policy of focusing development in a network of connected centres will, if implemented, create a metropolitan region that is socially and environmentally just and further establish the region as a wonderful place to live. However, if this is to happen, the GVRD must provide a new level of clarity and more specificity in their policies and guidelines on what does and does not support the LRSP. The GVRD leadership, at both the Board and staff levels, need to take a clear stand that business parks are contradictory to the LRSP and threaten the long-term livability of the region. Given that the GVRD must rely on the willing compliance of the municipalities to make land use decisions and investments that are consistent with the regional planning vision, the GVRD needs to articulate the LRSP in such a way that there can be no doubt as to what is, and what isn't, in contravention. The review of the LRSP, currently underway, provides an appropriate opportunity to provide clearer and more specific direction.

In the simplest terms, the municipalities in the region currently permitting business parks need to realize that this pattern of land use is not in the short or long term interest of the public. In light of the findings in this research, local planners and politicians need to review their policies towards business parks. They need to refocus their energies towards their regional town centres and explore new ways to facilitate office development in these centres. Land use decisions, made on the basis of taxation and market interest, without addressing the long term costs of pollution, congestion, land consumption, and equity, are short-sighted and compromise quality of life both inter-

and intra- municipal boundaries. It is, perhaps, sadly ironic that business parks do not even deliver on municipal tax and employment objectives.

A variety of data sources and analytical techniques have been drawn upon in this research. The mode split data and journey to work distance figures utilized above are from the Canadian Census, which ask only about the home-to-work trip. More detailed analysis, such as the trip diary study undertaken by Douglas and Evans (1997) in Washington, DC would provide more complete information on trip-making behaviour and travel patterns both before and after work, and during the day. A comprehensive economic impact analysis of business parks on local and regional economies would provide a more nuanced analysis of what economic impact, if any, limiting business park development would have.

There is some indication that the market is realizing that business parks are not good for business. In Vancouver the trendy downtown district known as Yaletown is thriving as high-tech firms are redeveloping and locating there. Avison Young predicts that "amenity requirements are increasingly pulling many tenants away from isolated business parks and toward downtown, town centres and other highly urban areas" (2004). The Urban Land Institute has published a guidebook entitled *Transforming Suburban Business Districts* (2001). In the United States, *USA Today* reports that "as the competition for high-skilled workers heats up, suburban office parks and corporate campuses are rethinking their sterile designs and adding shops, apartments and restaurants to create a slice of city life in suburbia" (2004).

While the goal of this research has been to examine business parks through the lens of sustainability and regional livability, the response to this research should not be to focus energy and resources to modifying or ameliorating business parks. Despite efforts underway in other metropolitan regions, 'better business parks' are not the solution. Adding "shops, apartments and restaurants" will not magically transform business parks into vibrant, diverse, urban areas. Complete communities take a long time to mature and include not just restaurants, shops, and office employment, but also a range of housing options, a diversity of jobs, childcare, community centres, schools, and libraries. It is both the synergies and critical mass of the people and activities in urban centres that enables the provision of a variety of transportation options. High

quality transit with multiple routes and frequent service requires high densities of jobs, services, and housing. Increasing the frequency of transit service to business parks, as demanded by many business park tenants, will not discourage people from driving. Crestwood Corporate Centre has fairly frequent bus service through the day and evening, while Glenlyon Business Park has only 15min service for a few hours in the morning and afternoon. However, at 5%, the transit mode split is exactly the same in both locations. The design and location of business parks promotes auto-dependency to such a great extent that mitigation attempts by increased transit and more shops and restaurants will not solve the problem.

In order to meet regional goals and municipal objectives and build a more sustainable region, offices need to be located in mixed use, pedestrian- and transit- oriented centres. Business park locations should be permitted only for industrial uses that have much lower employment ratios and have special space requirements. The solution is to locate offices in the existing urban centres, allowing for efficient and maximum use of infrastructure, reducing development pressure in the areas set aside for preservation, minimizing auto-dependence, reducing greenhouse gas emissions and air quality contaminants, and limiting outward expansion of commuter sheds. The eight regional town centres, fourteen municipal town centres and the metropolitan core in Greater Vancouver have the building blocks to establish Greater Vancouver as a livable region.

# REFERENCES


Archer WR, and MT Smith. 1993. "Why do Suburban Offices Cluster?". *Geographical Analysis* 25(1):53-64.

Avison Young. 2004. "Greater Vancouver Office Market Report: July 2004". Vancouver: Avison Young.

Badoe, D.A. and E.J. Miller (2000) "Transportation–land-use interaction: empirical findings in North America and their implications" *Transportation Research Part D: Transport and Environment* 5: 235 – 263.

Bagan, Ron. 3 August 2004. Personal Comments.

BC Legislature (Province of British Columbia Legislative Assembly). 1995. *Growth Strategies Statues Amendment Act.* Victoria: Queen's Printer. http://www.legis.gov.bc.ca/1995/3rd_read/gov11-3.htm

Beatley, Timothy and Kristy Manning. 1997. *The Ecology of Place: Planning for Environment, Economy, and Community.* Washington, DC: Island Press.

Bell, D. 1973. *The Coming of the Post-Industrial Society.* New York: Basic Books.

Bish, Robert. 2003. "Property Taxes on Business and Industrial Property in British Columbia: Comparisons and Business Climate Observations" Working Paper #11, Local Government Institute, School of Public Administration, University of Victoria.

Blumenberg, E. 2004. "En-gendering Effective Planning: Spatial Mistmatch, Low-Income Women, and Transportation Policy". Journal of the American Planning Association 70(3):269-281).

Blumenberg, E. 2002 "Planning for the transportation needs of welfare participants - Institutional challenges to collaborative planning". *Journal of Planning Education and Research.* 22(2):152-163.

Blumenberg, E., and K. Shiki. 2003. "How welfare recipients travel on public transit, and their accessibility to employment outside large urban centers" *Transport Quarterly* 57(2):25-37.

Blumenberg, E., and P. Ong. 2001. "Cars, buses, and jobs - Welfare participants and employment access in Los Angeles". *Transportation Research Record* (1756): 22-31.

Booth, Geoffrey. 2001. *Transforming Suburban Business Districts.* Washington: Urban Land Institute.

Bullard, Robert. 1994 (1990). *Dumping in Dixie: race, class, and environmental quality.* Boulder: Westview Press.

Bullard, Robert and Glenn Johnson (Eds). 1997. *Just Transportation.* Gabriola Island, BC: New Society Publishers.

Cairns, S., J. Greig, and M. Wachs. 2003. *Environmental Justice & Transportation: A Citizen's Handbook*. Institute of Transportation Studies at the University of California Berkeley.

City of Burnaby. 1995. *Rezoning Reference #42/94.*

City of Burnaby. 1995. *Rezoning Reference #45/95.*

City of Burnaby. 1996. *Rezoning Reference #40/96.*

City of Burnaby. 1997. *Rezoning Reference #22/97.*

City of Burnaby. 1998. *Rezoning Reference #41/96.*

City of Burnaby. 2000. *Rezoning Reference #00-06.*

City of Burnaby. 2001. *Rezoning Reference #01-13.*

City of Burnaby. 2002. *Rezoning Reference #02-18.*

Cervero, Robert. 1986. *Suburban Gridlock.* New Brunswick, N.J.: Center for Urban Policy Research.

Cervero, Robert. 1989. *America's Suburban Centres: the land use-transportation link.* Boston: Unwin Hyman.

Cervero, Robert. 2000. *Efficient urbanization : economic performance and the shape of the metropolis.*

Cervero, Robert. 2002. "Built environments and mode choice: toward a normative framework". *Transportation Research Part D.* 7:265-284.

Cervero, Robert, Onesimo Sandoval and John Landis. 2002. "Transportation as a Stimulus of Welfare-to-Work: private versus public mobility". *Journal of Planning Education and Research.* 22:50-63.

Christopherson, Frances. 2000. *Bibliography and Chronology of Regional Planning in British Columbia.* Victoria: Ministry of Municipal Affairs.

City of Burnaby. 2004. http://www.city.burnaby.bc.ca/business/centres/index.html (downloaded October 3, 2004)

City of Burnaby. 2004a. http://www.city.burnaby.bc.ca/cityhall/departments_planning/plnnng_plans_offclc.html#index (accessed October 3, 2004).

Coffey, William J. 1994. *The Evolution of Canada's Metropolitan Economies.* Montreal: Institute for Research on Public Policy.

Colliers International. 2004. *Market Update: Greater Vancouver Office First Quarter 2004*. Vancouver: Colliers International.

Daniels, P.W. 1979. *Spatial Patterns of Office Growth and Location.* New York: John Wiley & Sons.

Dorcey, Anthony. 2002. " Challenges of Sustainability Planning: Living Dangerously in Worlds of Theory and Practice". http://www.interchange.ubc.ca/dorcey/tony/tonydsustst.html

Douglas, G.B. and J.E. Evans. 1997. "Urban Design, Urban Form, and Employee Travel Behavior," paper presented at the Sixth Conference on the Application of Transportation Planning Methods, Transportation Research Board, Dearborn, Michigan. Downloaded October 15, 2004 at ntl.bts.gov/lib/7000/7500/7512/Dearborn.PDF. Pgs: 298-306.

Ewing, Reid and Robert Cervero. 2001 "Travel and the built environment: a synthesis" *Transportation Research Record* 1780: 87 – 114.

European Conference of Ministers of Transport. 2002. *Implementing Sustainable Urban Travel Policies: Final Report*. Paris: ECMT.

Filion, Pierre. 2001. "Suburban mixed-use centres and urban dispersion: what difference do they make?". *Environment and Planning A.* 33:141-160.

Filion, Pierre and Tod Rutherford. 2000. "Employment Transitions in the City". In T. Bunting and P. Filion (Eds). *Canadian Cities in Transition: the 21st Century.* Don Mills, ON: Oxford University Press.

Florida, Richard. 2002. *The Rise of the Creative Class.* New York: Basic Books.

Frank, Lawrence. 2004. "Economic Determinants of Urban Form: Resulting Trade-offs Between Active and Sedentary Forms of Travel". *American Journal of Preventive Medicine.* 27(3S):146-153.

Frank, Lawrence and James Chapman. 2004. SMARTRAQ Final Report, Georgia Department of
Transportation.

Frank, Lawrence., Peter Engelke, and Thomas Schmid. 2003. *Health and Community Design: The Impact of the Built Environment on Physical Activity.* Island Press: Washington.

Frank, Lawrence and Gary Pivo. 1995. "Impacts of Mixed Use and Density on Utilization of Three Modes of Travel: Single-Occupant Vehicle, Transit, and Walking". *Transportation Research Record 1466.*

Frank, Lawrence, Tom Schmid, James Sallis, James Chapman, Brian Saelens. *Forthcoming* 2005*. American Journal of Preventive Medicine*. 28(2S).

Gad, Gunter. 1991. "Office Location". In T. Bunting and P. Filion (Eds). *Canadian Cities in Transition: the 21st Century.* Toronto: Oxford University Press.

Gad, Gunter and Malcom Mathew. 2000. “Central and Suburban Downtowns”. In T. Bunting and P. Filion (Eds). *Canadian Cities in Transition: the 21st Century.* Toronto: Oxford University Press.

Garreau, Joel. 1991. *Edge City: Life on the New Frontier.* New York: Doubleday.

Gibson, Bill. 26 July 2004. Personal Communication.

Gihring TA. 1999. “Incentive property taxation - A potential tool for urban growth management”. *Journal of the American Planning Association*. 65(1):62-79. (based on study in Vancouver)

Gillham, Oliver. 2002. *The Limitless City: a primer on the urban sprawl debate.*Washington: Island Press.

Greater Vancouver Regional District. 1996 (1999). *Livable Region Strategic Plan.* Burnaby: Greater Vancouver Regional District.

Greater Vancouver Regional District. 2001. *2001 Annual Report: Livable Region Strategic Plan.* Burnaby: Greater Vancouver Regional District.

Greater Vancouver Regional District. 2002. *2002 Annual Report: Livable Region Strategic Plan.* Burnaby: Greater Vancouver Regional District.

Greater Vancouver Regional District. 2003a. *Regional Town Centres: Where are we now? Livable centres task group backgrounder #1 (draft).* Policy and Planning Department, GVRD.

Greater Vancouver Regional District. 2003b. *2003 Annual Report: Livable Region Strategic Plan.* Burnaby: Greater Vancouver Regional District.

Greater Vancouver Regional District. 2003c. *Regional Town Centres and Office Development: Livable centres task group backgrounder #3 (draft).* Policy and Planning Department, GVRD.

Greater Vancouver Regional District. 2004. *Building a Network of Livable Centres: Discussion Paper on Future Policy Directions.* Unpublished document.

Greater Vancouver Regional District. 2004b.
http://www.gvrd.bc.ca/livablecentres/networkcentres.htm

Handy, S. 2002 “Travel behavior-land use interactions: an overview and assessment of the research” in H.S. Mahmassini (ed.) *In Perpetual Motion: Travel Behavior Research Opportunities and Application Challenges*. Kidlington, UK: Elsevier Science, 223 – 236.

Hardin, Garrett. 1968. “The Tragedy of the Commons”. *Science*, 162:1243-1248

Harvey, David. 1989. *The Condition of Postmodernity: An Enquirey Into the Origins of Cultural Change.* Oxford: Blackwell.

Helling, A. (2002). “Transportation, Land Use, and the Impacts of Sprawl on Poor Children and Families”. In Squires, G. (Ed.) *Urban Sprawl: Causes, Consequences and Policy Responses.* The Urban Institute Press: Washington.

Hine, J., and F. Mitchell. 2001. "Better for Everyone? Travel Experiences and Transport Exclusion" *Urban Studies,* 38(2):319–332.

Hobsbawm, Eric. 1994. *Age of Extremes: The Short Twentieth Century 1914-1991.* Abacus: London.

Hoover, Edgar M. and Raymond Vernon. 1959. *Anatomy of a Metropolis; The Changing Distribution of People and Jobs Within the New York Region.* Cambridge: Harvard University Press.

Hurst, Darrell. 17 August 2004. Personal Communication.

Hutton, Tom and H. Craig Davis. 1985. "The Role of Office Location in Regional Town Centre Planning and Metropolitan Multinucleation: The Case of Vancouver." *Canadian Journal of Regional Science*. 8(1):17-34.

Jenkens, Lyssa. 1996. *Office Location in a Post-Industrial Urban Environment.* Brookfield, VT: Ashgate.

Kain, John. 1968. "Housing segregation, Negro employment, and metropolitan decentralization". *Quarterly Journal of Economics* 82:175-97.

Kain, John. 1994. "The Spatial Mismatch Hypothesis: Three Decades Later". *Housing Policy Debate* 3(2):371-459.

Lang, Robert. 2000. "Office Sprawl: The Evolving Geography of Business." Center on Urban and Metropolitan Policy Survey Paper Series (October). Washington: Brookings Institute Press.

Lang, Robert. 2003. *Edgless Cities: exploring the elusive metropolis.* Washington: Brookings Institute Press.

Lang, Robert and J. LeFurgy. 2003. "Edgeless Cities: examining the noncentred metropolis". *Housing Policy Debate.* 14(3):427-460.

LeGates, Richard T. and Frederic Stout. 2000. *The City Reader 2nd Edition.* London: Routledge.

Leinberger, Christopher. 1990. "Development Trends and Real Estate Opportunities in the 1990s". *Urban Land* 49(12):4-9.

Leinberger, Christopher. 1988. "The Six Types of Urban Village Cores". *Urban Land* 47(5):24-27.

Leinberger, Christopher and Charles Lockwood. 1986. "How Business is Reshaping America". *Atlantic Monthly* 258(4):43-52.

Litman, Todd. 1995. "Land Use Impact Costs of Transportation," *World Transport Policy & Practice*. 1(4):9-16.

MacLaran, Andrew and J. Killen. 2002 “Land-use planning and sustainability issues: the case of offices in Dublin” *Journal of Irish Urban Studies*, 1(1), 21-35.

Marshall, Alex. 2000. *How Cities Work: suburbs, sprawl, and the roads not taken.* Austin: University of Texas Press.

Mathew, Malcolm. 1992. “Office Buildings in Office Parks and Suburban Downtowns”. *Canadian Journal of Urban Research* 1(1):39-57.

McKeever, Ross. 1970. *Business Parks, Office Parks, Plazas & Centres.* Washington: The Urban Land Institute.

NAIOP (National Association of Industrial and Office Parks). 1986. *Parking for Industrial and Office Parks.* NAIOP.

National Round Table on the Environment and the Economy. 2003. *The State of the Debate on the Environment and the Economy: Environmental Quality in Canadian Cities: the Federal Role.* Ottawa: National Round Table on the Environment and the Economy.

National Round Table on the Environment and the Economy. *The State of the Debate on the Environment and the Economy: The Road to Sustainable Transportation in Canada.* Ottawa: National Round Table on the Environment and the Economy.

New South Wales Department of Urban Affairs and Planning. 2001. *Integrating Land Use and Transport: the right place for business and services.* www.duap.nsw.gov.au

Newman, Peter and Jeffrey Kenworthy. 1989. *Cities and Automobile Dependence: A Sourcebook.* Brookfield, VT: Gower Publishing Company.

Newman, Peter and Jeffrey Kenworthy. 1999. *Sustainability and Cities: Overcoming Automobile Dependence.* Washington, D.C.: Island Press.

Persky, Joseph and Wim Wiewel. 2000. *When Corporations Leave Town: The costs and benefits of metropolitan job sprawl.* Detroit: Wayne State University Press.

Pisarski, Alan. 1987. *Commuting in America.* Westport, CT: Eno Foundation for Transportation.

Pivo, Gary. 1990. “The net of mixed beads: suburban office development in six metropolitan regions.” *Journal of the American Planning Association*. 56:457-69.

Pivo, G., 1993. “A Taxonomy of Suburban Office Clusters: The Case of Toronto”. *Urban Studies*. 30(1):31-50.

Preston, V., and McLafferty, S. 1999. “Spatial mismatch research in the 1990s: progress and potential”. *Papers in Regional Science.* 78(4):387-402.

Raad, Tamim. 2002. “Climate Change Panel Document: Urban Transportation”. Unpublished.

Robbins, Sidney N. and Nestor E. Terleckyj. 1960. *Money Metropolis: A Locational Study of Financial Activites in the New York Region.* Cambridge: Harvard University Press.

Royal LePage Advisors Inc. 2001. *The GVRD Office Market: supply, demand, and spatial distribution.* Vancouver: Royal LePage. http://www.gvrd.bc.ca/growth/publications.htm

Royal LePage Advisors Inc. 2003. *Commercial and Industrial Real Estate Development Trends and Forecast for the Great Vancouver Region, 1991 to 2001.* Vancouver: Royal LePage. http://www.gvrd.bc.ca/growth/publications.htm

Sawicki, D. and M. Moody. (2000). "Developing Transportation Alternatives for Welfare Recipients Moving to Work". *Journal of the American Planning Association*. 66(3):306-318.

Schmenner, Roger. 1982. *Making Business Location Decisions.* Englewood Cliffs, NJ: Prentice Hall.

Schoup, Donald. 1997. "The High Cost of Free Parking". *Journal of Planning Education and Research.* 17:3-20.
Schoup, Donald and Don Pickrell. 1979. *Free Parking as a Transportation Problem.* Los Angeles: Graduate School of Architecture and Urban Planning, University of California.

Sheehan, M. O'Meara. (2001). *City Limits: Putting the Brakes on Sprawl.* Worldwatch Institute: Washington.

Shorett, Mark. 2004. *Hedge Cities: Gambling on Regional Futures.* Masters Thesis, Department of Urban Studies and Planning, Massachusetts Institute of Technology.

Squires, G. (Ed). (2002). *Urban Sprawl: Causes, Consequences, and Policy Response.* The Urban Institute Press: Washington.

Steiner, R.L. (1995) "Residential density and travel patterns: review of the literature" *Transportation Research Record* 1466: 37 – 43.

Thorstad, Linda. 30 August 2004. Personal Communication.

*Urban Land*. September 2003. "New Urban News".

Urban Land Institute. 2001. *Transforming Suburban Business Districts.* Washington, DC: ULI-the Urban Land Institute.

USA Today. 14 September 2004. "Suburban office parks get urban injection" Pg. 15A.

Wiewel, Wim and Joseph J. Persky (Eds). 2002. *Suburban Sprawl: Private Decisions and Public Policy.* New York: M.E. Sharpe, Inc.

Willson, Richard and Donald Shoup. 1990. *The Effects of Employer Paid Parking in Downtown Los Angeles: A Study of Office Workers and Their Employees.* Los Angeles: Graduate School of Architecture and Urban Planning, University of California.

Wollenberg, Jay. 12 August 2004. Personal Communication.

Young, Andrew. 2001. *Growth Management and Regional Planning in British Columbia: Five Years After, A Comparative Analysis.* Masters Thesis, School of Community and Regional Planning, University of British Columbia.

# APPENDIX

Appendix A Information Card Distributed to Interview Subjects

Greater Vancouver Regional District

UBC

## Working in and Commuting to Business Centres

The Greater Vancouver Regional District (GVRD), in partnership with the University of British Columbia, is currently conducting research on transportation access to business centres in the region. People who work in suburban business centres are being interviewed about their commuting patterns and their perceptions of the location of their employment.

The GVRD is striving to create a more livable region. Improving transportation is a critical component of this endeavour. This study will help us understand people's commuting patterns and preferences.

Any identifying information of individuals or small groups of individuals that is obtained during this study will be kept in the strictest confidence, unless specific consent for any attributable information is granted in advance of distribution. Your participation in this study is entirely voluntary and you can refuse to participate at any time

Contact information on reverse.

Greater Vancouver Regional District

UBC

## Working in and Commuting to Business Centres

Interviews are being conducted by Sarah McMillan. Please feel free to phone or email Sarah to arrange an alternate interview time or if you have further comments following the interview.

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If you have any concerns or would like more information about this project, please contact

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Appendix B Survey Instrument for Business Park Employees

(Interviews conducted in person and responses filled out by interviewer).

**1. How do you normally get to work?**

☐ **I Drive By Myself to Work**

- How long is your commute? _____minutes _____kilometers
- Do you need a car during the day for your job? ____Yes _____No
- Where do you typically park?
  - ☐ On the street
  - ☐ In a parkade or parking lot in or adjacent to my building
- Do you have to pay to park? ____No _____Yes
- How much does it personally cost you to park? $____per day $____per month

☐ **I Take Transit to Work**

- **What route(s) do you take?**

_____ transfer to _____ transfer to_____

- How long does it take you to get to work? _____minutes
- Do you have the option of driving to work? ____Yes _____No
- Would you drive if you had the option to? ____Yes _____No

☐ **I Bicycle to Work**

- How long does is your bike ride? _____minutes _____kilometers
- Where do you lock your bike?
  - ☐ Secure facilities inside building
  - ☐ Bike rack immediately outside building
  - ☐ Bike rack not adjacent to building
  - ☐ To a street sign or parking meter
  - ☐ I take it right to my office/work station
  - ☐ Other, please specify _____
- Do you have access to showers? ____Yes _____No
- Do you have the option of driving to work? ____Yes _____No
- Would you drive if you had the option to? ____Yes _____No

☐ **I Carpool to Work**

- How many other people do you travel with? _____
- How close by do your carpool-mates work?
  ___same building ____nearby building _____another location
- How long is your commute? _____minutes _____kilometers
- Do you have the option of driving by yourself to work? ____Yes _____No

☐ **I Walk to Work**

- How long does it take you to walk to work? _____minutes _____kilometers
- Do you have the option of driving to work? ____Yes _____No

**2. How do you find your commute to work?**

_____

_____

_____

**3. Do you ever travel to or from work using another form of transportation?**

- ☐ No
- ☐ Yes, please answer the above questions for your alternate way of getting to work. Please be sure to mark “Alternate” and indicate how many trips to or from work in a typical month would be via this mode.

**4. If you normally drive to work, have you ever traveled to or from work via transit, cycling, or walking?**

- ☐ Yes – How did you find it?
- ☐ No – Do you think it would be possible for you to take transit, walk, or cycle to work? Please explain why or why not.

_____

_____

_____

**5. We are interested in your ability to get to restaurants, shops, and services during the day.**

**Are you able to do errands at lunch?**

- ☐ Yes, I can walk to nearby shops and services
- ☐ Yes, I drive to nearby shops and services
- ☐ No

**Are you able to get to appointments (eg medical, financial, legal) during the day?**

- ☐ Yes, I can walk to nearby offices for appointments
- ☐ Yes, I can drive to nearby offices for appointments
- ☐ No

**6. If you normally take transit to work, what do you do if for some reason you need to leave partway through the day (illness, family emergency)?**

_____

_____

_____

**7. Thinking about the location, and not about your specific job, do you like working here in this business park? What do you like and dislike about it?**

_____

_____

_____

8. **How long have you worked in this location? _____years**
9. **Why did you relocate? ___took a new job ___my company moved**
10. **Did you have to buy a car in order to get to work in this location?**

    ☐ Yes ☐ No

11. **Where did you work before? (nearest intersection) _____**
12. **How does this current location compare to your previous work location?**

_____

_____

_____

13. **If you had the opportunity to have exactly the same job but in a location that had good transit access and was also close to restaurants and other shops and services, but where parking was limited and you had to pay for parking, would you prefer this location or your current location?**

    ☐ Prefer this business park location

    ☐ Prefer more central location

    **Please explain your reasons for your preference.**

_____

_____

_____

14. **What municipality do you live in? _____**
15. **What is the closest intersection to your house? _____**
16. **What type of work do you do?**

    Job title or occupation _____

    ☐ Manufacturing or production

    ☐ Work at a desk

    ☐ Security, maintenance, cleaning

17. **Is there anything about the nature of your job that prevents you from locating in any office building?**

18. **Just to confirm, do you own, lease or have full time access to a car?**

    ☐ Yes ☐ No

19. **How many adults and children live in your household?**

    _____ **Adults (18+)**

    _____ **Children (0-17)**

**20. What is your total annual household income (before taxes)?**

- ☐ Less than $30,000
- ☐ $30,000 - $49,999
- ☐ $50,000 - $74,999
- ☐ $75,000 - $99,999
- ☐ $100,000 or more

**21. Do you have any ideas on how your current work location could be improved?**

_____

_____

_____

THANK YOU VERY MUCH FOR YOUR PARTICIPATION IN THIS RESEARCH.
WE GREATLY APPRECIATE YOUR TIME AND INPUT.

## Appendix C 1995 Growth Strategies Act: Planning Objectives

1. Avoiding urban sprawl and ensuring that development takes place where adequate facilities exist or can be provided in a timely, economic and efficient manner
2. Settlement patterns that minimize the use of automobiles and encourage walking, bicycling and the efficient use of public transit
3. The efficient movement of goods and people while making effective use of transportation and utility corridors
4. Protecting environmentally sensitive areas
5. Maintaining the integrity of a secure and productive resource base, including the agricultural and forest land reserves
6. Economic development that supports the unique character of communities
7. Reducing and preventing air, land and water pollution
8. Adequate, affordable and appropriate housing
9. Adequate inventories of suitable land and resources for future settlement
10. Protecting the quality and quantity of ground water and surface water
11. Settlement patterns that minimize the risks associated with natural hazards
12. Preserving, creating and linking urban and rural open space including parks and recreation areas
13. Planning for energy supply and promoting efficient use, conservation and alternative forms of energy
14. Good stewardship of land, sites and structures with cultural heritage value

Source: BC Legislature, 1995a, s.942.11 s.s(2)

Appendix D Taxes Levied for Selected Office Buildings in Burnaby

| | Metrotown | | | | Business Parks in Burnaby | | |
|---|---|---|---|---|---|---|---|
| Address | AIR 4710 Kingsway (Metrotower I) | AIR 4720 Kingsway (Metrotower II) | 4555 Kingsway | 4603 Kingsway | 8800 Glenlyon Pkwy | 9100 Glenlyon Pkwy | 5000 North Fraser Way |
| **Site and Building Size** | | | | | | | |
| Building Square Footage | 261,479 | 351,046 | 159,860 | 97,000 | 120,150 | 59,899 | 54,292 |
| Site Square Footage | 11,000 | 14,205 | 40,736 | 47,910 | 355,667 | 247,421 | 152,460 |
| Site Acres | 0.25 | 0.33 | 0.935 | 1.10 | 8.165 | 5.68 | 3.5 |
| **Assessed Value (2004)** | | | | | | | |
| Gross Land | $ 7,843,000 | $ 10,530,000 | $ 4,370,000 | $ 4,993,000 | $ 3,201,000 | $ 2,231,000 | $ 1,693,000 |
| Gross Improvements | $ 41,091,000 | $ 56,828,000 | $ 24,248,000 | $ 8,637,000 | $ 8,793,000 | $ 6,880,000 | $ 4,861,000 |
| Net Assessed | $ 48,924,000 | $ 67,348,000 | $ 28,608,000 | $ 13,620,000 | $ 11,984,000 | $ 9,101,000 | $ 6,544,000 |
| Assessed Value of Land per Square Foot | $ 713.00 | $ 741.29 | $ 107.28 | $ 104.22 | $ 9.00 | $ 9.02 | $ 11.10 |
| Assessed Value of Improvements per Square Foot | $ 157.15 | $ 161.88 | $ 151.68 | $ 89.04 | $ 73.18 | $ 114.86 | $ 89.53 |
| **Taxes Levied 2004** | | | | | | | |
| Tax Levy | $ 1,262,009 | $ 1,737,262 | $ 737,952 | $ 351,332 | $ 309,131 | $ 234,763 | $ 168,804 |
| Taxes Levied per Building Square Foot | $ 4.83 | $ 4.95 | $ 4.62 | $ 3.62 | $ 2.57 | $ 3.92 | $ 3.11 |
| Taxes Levied per Site Square Foot | $ 114.73 | $ 122.30 | $ 18.12 | $ 7.33 | $ 0.87 | $ 0.95 | $ 1.11 |

| | Business Parks in Burnaby | | | | | | |
|---|---|---|---|---|---|---|---|
| Address | 9200 Glenlyon Pkwy | 5005 North Fraser Way | 4601 Canada Way (3 buildings) | 4567 Canada Way | 4401 Still Creek Dr. | 4333 Still Creek Dr. | 4400 Still Creek Dr. |
| **Site and Building Size** | | | | | | | |
| Building Square Footage | 50,140 | 230,574 | 106,570 | 67,000 | 67,305 | 54,948 | 50,140 |
| Site Square Footage | 172,498 | 223,889 | 164,150 | 103,764 | 66,952 | 181,055 | 172,498 |
| Site Acres | 3.96 | 5.14 | 3.77 | 2.38 | 1.54 | 4.16 | 3.96 |
| **Assessed Value (2004)** | | | | | | | |
| Gross Land | $ 1,860,000 | $ 4,182,000 | $ 3,153,000 | $ 1,250,000 | $ 1,152,000 | $ 2,805,000 | $ 1,860,000 |
| Gross Improvements | $ 5,128,000 | $ 34,951,000 | $12,080,000 | $ 9,657,000 | $ 7,052,000 | $ 2,854,000 | $ 5,128,000 |
| Net Assessed | $ 6,978,000 | $ 39,123,000 | $15,223,000 | $10,897,000 | $ 8,194,000 | $ 5,649,000 | $ 6,978,000 |
| Assessed Value of Land per Square Foot | $ 10.78 | $ 18.68 | $ 19.21 | $ 12.05 | $ 17.21 | $ 15.49 | $ 10.78 |
| Assessed Value of Improvements per Square Foot | $ 102.27 | $ 151.58 | $ 113.35 | $ 144.13 | $ 104.78 | $ 51.94 | $ 102.27 |
| **Taxes Levied 2004** | | | | | | | |
| Tax Levy | $ 180,000 | $ 1,009,190 | $ 392,682 | $ 281,091 | $ 211,367 | $ 145,718 | $ 180,000 |
| Taxes Levied per Building Square Foot | $ 3.59 | $ 4.38 | $ 3.68 | $ 4.20 | $ 3.14 | $ 2.65 | $ 3.59 |
| Taxes Levied per Site Square Foot | $ 1.04 | $ 4.51 | $ 2.39 | $ 2.71 | $ 3.16 | $ 0.80 | $ 1.04 |

Appendix E Taxes Levied for Selected Office Buildings in Richmond

| | Richmond Centre | | | Business Parks in Richmond | | | |
|---|---|---|---|---|---|---|---|
| **Address** | **5611 Cooney Rd.** | **5811 Cooney Rd.** | **5900 No. 3 Rd. (Strata)** | **13800 Commerce Pkwy** | **13777 Commerce Pkwy** | **13575 Commerce Pkwy** | **13511 Commerce Pkwy** |
| **Site and Building Size** | | | | | | | |
| Building Square Footage | 43,612 | 109,374 | 43,923 | 182,256 | 83,350 | 78,423 | 96,835 |
| Site Square Footage | 39,385 | 58,879 | 59,126 | 324,618 | 167,669 | 183,227 | 196,280 |
| Site Acres | 0.90 | 1.35 | 1.36 | 7.45 | 3.85 | 4.21 | 4.51 |
| **Assessed Value (2004)** | | | | | | | |
| Gross Land | $ 2,756,000 | $ 4,117,000 | $ 3,556,000 | $ 4,677,000 | $ 2,502,000 | $ 2,730,000 | $ 2,932,000 |
| Gross Improvements | $ 3,055,000 | $ 10,313,000 | $ 2,858,000 | $11,856,000 | $ 7,218,000 | $ 6,223,000 | $ 6,390,000 |
| Net Assessed | $ 5,811,000 | $ 14,430,000 | $ 6,394,000 | $16,523,000 | $ 9,710,000 | $ 9,312,000 | $ 9,312,000 |
| Assessed Value of Land per Square Foot | $ 69.98 | $ 69.92 | $ 60.14 | $ 14.41 | $ 14.92 | $ 14.90 | $ 14.94 |
| Assessed Value of Improvements per Square Foot | $ 70.05 | $ 94.29 | $ 65.07 | $ 65.05 | $ 86.60 | $ 79.35 | $ 65.99 |
| **Taxes Levied 2004** | | | | | | | |
| Tax Levy | $ 136,552 | $ 338,487 | $ 150,691 | $ 387,837 | $ 226,963 | $ 218,679 | $ 218,679 |
| Taxes Levied per Building Square Foot | $ 3.13 | $ 3.09 | $ 3.43 | $ 2.13 | $ 2.72 | $ 2.79 | $ 2.26 |
| Taxes Levied per Site Square Foot | $ 3.47 | $ 5.75 | $ 2.55 | $ 1.19 | $ 1.35 | $ 1.19 | $ 1.11 |

| | Business Parks in Richmond | | | | |
|---|---|---|---|---|---|
| Address | 13071 Vanier Pl | 13091 Vanier Pl | 10271 Shellbridge Way | 10711 Cambie Rd | 10991 Shellbridge Way |
| **Site and Building Size** | | | | | |
| Building Square Footage | 28,000 | 49,400 | 97,137 | 100,128 | 79,039 |
| Site Square Footage | 52517 | 67,694 | 189,509 | 124,614 | 154,903 |
| Site Acres | 1.21 | 1.55 | 4.35 | 2.86 | 3.56 |
| **Assessed Value (2004)** | | | | | |
| Gross Land | $ 783,000 | $ 1,010,000 | $ 3,224,000 | $ 2,120,000 | $ 6,964,000 |
| Gross Improvements | $ 1,351,000 | $ 3,739,000 | $ 9,224,000 | $ 6,794,000 | $ 2,636,000 |
| Net Assessed | $ 2,124,000 | $ 4,739,000 | $12,438,000 | $ 8,914,000 | $ 9,590,000 |
| Assessed Value of Land per Square Foot | $ 14.91 | $ 14.92 | $ 17.01 | $ 17.01 | $ 44.96 |
| Assessed Value of Improvements per Square Foot | $ 48.25 | $ 75.69 | $ 94.96 | $ 67.85 | $ 33.35 |
| **Taxes Levied 2004** | | | | | |
| Tax Levy | $ 49,919 | $ 111,121 | $ 291,849 | $ 208,860 | $ 225,075 |
| Taxes Levied per Building Square Foot | $ 1.78 | $ 2.25 | $ 3.00 | $ 2.09 | $ 2.85 |
| Taxes Levied per Site Square Foot | $ 0.95 | $ 1.64 | $ 1.54 | $ 1.68 | $ 1.45 |