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Date April 29, 1986
ABSTRACT

Telecommuting has been defined in several ways. For the purpose of this paper, telecommuting (also known as teleworking) is defined as the concept of employees performing some portion of their regular work activities from a remote location, while receiving their regular salary and benefits. This remote work location is typically a satellite office, a neighbourhood office or the employee's home.

Most telecommuting occurs on a part-time basis, one to three days per week. Not every job nor every worker is suitable to telecommute. Although the actual number of telecommuters is unknown, it has been estimated that approximately 7.6 million Americans were telecommuters in 1993 -- 6.1% of the total American workforce. If even a slightly smaller proportion of telecommuters is applied to the Canadian workforce (i.e. 5.75%), there are at least 738,150 Canadian telecommuters.

While being influenced by many factors, telecommuting has risen in prominence primarily due to transformations in telecommunications and information technology, the nature of work, the workers, the workplace, urban highway congestion and in some jurisdictions, environmental legislation. Encouraging the establishment of telework centres and home-based telecommuting can increase employment opportunities within the community. Reducing the number of daily trips to a central work place may reduce transportation infrastructure costs (construction and maintenance) and have a positive effect on the environment (improved air quality and energy conservation). With more people staying within their neighbourhood to work, a greater sense of community can result.

Telecommuting deserves serious attention on the part of municipalities because it can deliver large benefits in economic, environmental and social terms. This paper is designed to inform, stimulate
discussion, and aid in the review of out-dated municipal regulations and procedures as they pertain to telecommuting.
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ACKNOWLEDGMENTS

Returning to school had a significant impact on my family and a lot of adjustments had to be made. Without my family's support I would have found the transition back to being a student very difficult.

A very special thank you must go to my husband Ken. Ken provided me with endless encouragement, support and guidance. Without Ken's thorough knowledge of the topic, his experience in assisting organizations to implement telecommuting programs and my unrestricted access to his telecommuting library, this thesis would not have been possible.

I must also thank my employer, the City of Surrey. Through their willingness in granting me a leave of absence, I was able to fulfil my long-time educational goal and concentrate wholly on my studies. As a result of my absence, my peers in the Planning and Development Department had to make adjustments and for that I am very grateful.
1.0. Purpose

Traditionally, city planners have recognized the incompatibility of certain land uses and have encouraged and regulated the separation of these incompatible uses. The downtown has been the focus of office activity and the suburban communities have received primarily residential and industrial development. As a result of the increasing distance between work and home, there have been increasing demands placed on our roads and on our time due to longer commutes.

An extreme example of how dependent North Americans have become on commuting to work is Los Angeles, California -- North America's most traffic-choked metropolis. In 1990, it was predicted that "by the turn of the century 96 per cent of the [L.A.] citizenry will travel by car [and that] the average morning rush-hour speed on the entire freeway system in the year 2000 [would] be roughly 17 miles [27 kilometres] an hour, or roughly half the speed in 1980."\(^1\) This prediction has proven to be too optimistic. In March 1993, state transportation officials determined that the average speed on L.A. county freeways had already fallen below 20 miles (32 kilometres) per hour. The effects to urban traffic congestion are not limited to personal stress and costs of delays, but "commuting in general, and peak-hour congestion in particular, are major sources of air pollution."\(^2\)

As a result of the devastating January 17, 1994 Los Angeles earthquake, which measured 6.6 on the Richter scale, Angelenos were forced to re-examine their commuting patterns. The earthquake destroyed portions of six key freeways in the Los Angeles area. With this damage estimated at $100 million U.S. to repair, and taking up to a year, thousands of commuters had to find alternative routes to work.\(^3\)

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2USA, Department of Transportation, "Transportation Implications of Telecommuting," vii.
To assist Los Angeles-area residents facing nightmarish traffic because of the earthquake, Pacific Bell announced a package intended to make it easier to work at home.\(^4\) The telephone company waived installation fees for a month following the quake and donated $1 million to customers in the earthquake-damaged areas, to fund loans for telecommuting equipment. In addition, at least 30 companies which have been displaced by the earthquake or related damage, are seeking the use of telecommuting centres and some of these centres have yet to open.\(^5\)

Being able to work from remote locations is possible for a greater number of the work force because the type of work people perform is changing and because of advancements in technology. The most significant occupational shift has been the shift out of basic production industries, into services and technology-intensive and value-added manufacturing. The industrialized economy has been described by economist Nuala Beck as having three economic movements since 1850. The commodity processing economy (1850 - 1918) was driven by an abundant supply of cheap steel. The mass-manufacturing economy (1918 - 1981) was driven by energy, specifically oil. Today we are in the technology economy which is driven by microchips.\(^6\)

American futurist Alvin Toffler has predicted that the 'electronic cottage' or 'high-tech' home, will increasingly become the place of work. "If this were to happen, every institution we know, from the family to the school and the corporation, would be transformed."\(^7\) This prediction is becoming reality in many regions of the world.

The needs of the workers are changing due, in part, to the changing composition of the family. Until the 1960s, the nuclear family was typical: the father worked outside of the home and the mother stayed home to care for the children. In Canada, the percentage of two-adult families has

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\(^6\)Nuala Beck, Shifting Gears: Thriving in the New Economy, 18.
\(^7\)Alvin Toffler, The Third Wave, 194.
decreased from 93% in 1961 to 87% in 1991. For those two-parent families, including common-law couples, the incidence of the husband-only working has noticeably dropped from 68% in 1961 to 15.9% in 1991.

The needs of the workers are also changing due to changing attitudes. Futurist Faith Popcorn sees *cocooning* -- people insulating themselves in their homes -- as moving into a newer, darker phase. "The fortress will be the centre of production (we'll work at home) and the centre of security (we'll make the fortress intruder-proof) and the centre of consumption."8 The degree to which people are choosing to seclude themselves in their homes is debatable, however, the ability to do so is increasingly easier, primarily due to technology.

The needs and abilities of our future workers must also be recognized. Today's young students are accustomed to high technology in the classroom and increasingly at home. In 1992, it was estimated that 51.6% of American households owned personal computers9 versus 36.3% in 1991.10 When these students enter the workforce, antiquated technology will be unacceptable.

As a result of these various socio-economic and environmental factors, telecommuting is gaining momentum. Telecommuting is the concept of employees performing some portion of their regular work activities from a remote location. This remote work location can be the employee's home or a telework centre. The implications of telecommuting on how cities are organized and managed is only beginning to be recognized.

This paper will propose a common definition of telecommuting and describe why it is becoming a factor in the Canadian working environment. Based on literature reviews and analyses of

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telecommuting programs, the advantages and disadvantages of this emerging work option are described from the perspective of the employee, employer, and society as a whole.

It is the author's contention that telecommuting deserves serious attention because of the significant economic, environmental, and social benefits which can be derived. Municipal government officials should be cognizant of these impacts from the point of view of their own employees, and present and future employers within their community and society in general.

This paper describes six areas which municipal officials need to analyze and possibly implement changes to actively support, encourage, and evolve telecommuting within their community. These six areas are described and using the City of Surrey, British Columbia as a case study, recommendations are made in terms of regulations and procedures which assist in implementing telecommuting.
2.0. Introduction

This section sets the foundation for this paper. The term telecommuting is defined and where it occurs is described. A distinction is made between telecommuting and home-based businesses and this is explained. Finally, this section describes the emerging work options that are becoming more prevalent in contemporary society.

2.1. Telecommuting Defined

In 1973, Jack Nilles from the University of Southern California, coined the synonymous terms 'telecommuting' and 'teleworking', while studying the concept of people working away from the office. In his 1980 book, The Third Wave, Alvin Toffler supported this observation, arguing that, as the structure of our economy changed from industrial to information-based, the computer would offer more freedom on the job, including the freedom to take work home to what Toffler described as the 'electronic cottage'.

Telecommuting has been defined in several ways. For the purpose of this paper, telecommuting (also known as teleworking) is defined as the concept of employees performing some portion of their regular work activities from a remote location, while receiving their regular salary and benefits. This remote work location is typically a satellite office, a neighbourhood office, or the employee's home. With improved mobile communications and smaller more powerful portable personal computers, work locations can also include cars, airplanes, ferries, and hotel rooms. Employees use technology such as personal computers, modems, telephones, and facsimile machines to connect electronically to the central office. Telecommuting, in essence, moves work to the worker and not the worker to the work.

11"Profile: Jack Nilles," TeleTrends, 1.
While being influenced by many factors, telecommuting has risen in prominence primarily due to transformations in the following areas: telecommunications and information technology; the nature of work; the workers; the workplace; urban highway congestion; and in some jurisdictions, environmental legislation. Although the land use implications are similar, the definition of telecommuting chosen for this paper does not include home-based businesses. Telecommuters are, therefore, considered employees of private or public sector organizations.

Telecommuting is not for everyone, and merely the desire to work remotely does not qualify an employee for telecommuting. Telecommuters are self-starters who have proven their abilities to do work independently. They know how to organize their work and manage their time. They have learned how their organizations work and have trusting relationships with their managers. Their work requires minimal ad hoc face-to-face communication. Their work tasks can be clearly defined and easily measured. Their managers trust their employees, manage by outputs, and have open, positive attitudes about telecommuting.12

2.2. Where Does Telecommuting Occur?

Telecommuting can take place from a satellite office, a neighbourhood office, or the employee's home. Studies suggest that the most successful telecommuters work remotely one to three days per week rather than on a full-time basis.13

The term telework centre is used to describe satellite offices and neighbourhood offices. The satellite office is a remote office established in a suburb by the employer. The intent is to have workers commute to an office which is closer to their homes on a part-time basis, as opposed to

12 Lauren Mavis Speeth, "The Attributes of Successful Managers of Telecommuters and Successful Telecommuting Programs," (Ph.D. diss., Golden Gate University, 1992).
all workers having to travel daily to one location.

A neighbourhood office houses employees from multiple companies or organizations. Workers come to the neighbourhood office to work because they all live in the same neighbourhood, not because they all work for the same organization. Similar to the neighbourhood office concept is a telecottage. A telecottage "is a room in a [remote] village, which is available to local people for learning or work, creating revenue and employment...."14

In home-based telecommuting, the employee works from an office established at home. Home-based telecommuting can provide people the opportunity to work, which otherwise may not have been possible. For instance, people who are physically challenged or people who live too far away from employment areas could work from home.

Telecommuting can also take place while in transit. Many private vehicles are equipped with cellular phones and some with the capability of fax and data transmission. The British Columbia Ferry Corporation's newest ferries are equipped with work stations with 110 volt receptacles, for use by people working on their portable computers. Some commercial airlines have added telephones at the seats of their passengers. The new Boeing 777 commercial two-engine jet scheduled for release in the mid-1990s is being designed with a revolutionary cabin management system which will include a fiber-optic network that extends to every seat. This network will allow passengers "to communicate with colleagues on the ground or in other planes ... [and] it is just a matter of time before onboard networks [will] also allow fliers to send and receive faxes and E-mail."15

Other businesses seeking to improve service to their customers are hotel operators. Many hotels

catering to business travelers now offer two phone lines in their guest rooms -- one for voice communication (using the telephone) and one for data transmission (using the portable computer's modem).

Improved telecommunications and information technologies for decreasing cost, is making it easier to work anytime and anywhere. It is generally agreed that the incidence of telecommuting will increase. The increase will more likely be "an evolutionary change in working practices as a long-term result of the Information Technology Revolution... It will become accepted practice for people to spend part of their time working outside the traditional office."16

2.3. Home-Based Businesses

For the purpose of this paper, a distinction has been made between telecommuting and operating a home-based business and, therefore, the definition chosen for telecommuting in this paper specifically excludes home-based businesses. Although the land use implications, on the surface, are similar between home-based telecommuting and home-based businesses, there are important differences.

Telecommuters are considered employees of an organization (public or private sector) and are not entrepreneurs. Telecommuters are generally not performing their job remotely on a full-time basis, but rather, are traveling to their central office two to three days a week. There is generally no indication from the outside of the home that the resident is telecommuting.

Home-based business workers, on the other hand, are entrepreneurs. Their homes are their only place of work and because of that business licenses are required. Unlike home-based

16Mike Gray, Noel Hodson and Gil Gordon, Teleworking Explained, 22.
telecommuters, home-based business operators can deduct the space occupied by their home occupation from their taxes. There may be evidence from the outside of the home that a business activity is occurring inside the home, such as signage and increased traffic from couriers and customers.

Home occupations can vary from artist and physician, to cabinet maker and car mechanic. Because of the variety of possible businesses operating from homes, there are legitimate planning concerns that often require regulations. Concerns which are usually addressed by regulations deal with the following issues:

1. Traffic and parking;
2. Privacy, security and noise; and
3. Residential character of the neighbourhood.17

To address traffic and parking concerns, home occupations are usually limited in scope and scale. In some by-laws, employees must be residents of the dwelling unit. Where home occupations are located in multiple residential buildings, privacy of other residents may be affected. Noise generated is a consideration for all neighbours. Home occupations should not have a negative effect on the residential character of the neighbourhood. To address this, signage may be restricted and rental of the space may be prohibited.18

It is difficult to obtain statistical information related to home-based businesses. Some of the reasons why home-based businesses may operate undetected include the following:

17 City of Toronto, Planning and Development Department, "Proposed Zoning By-law amendment with respect to 'home occupations,'" February 9, 1993, 12.
18 James E. Randall and Denise Nagel, "Home-Based Business Regulations and Bylaws: Canadian Municipalities in 1993."
• home businesses operating without retail sales tax permits or business licenses;
• home-based business operators failing to report income to avoid taxes;
• no construction necessary and, therefore, no building permits required;
• no Standard Industrial Classification (SIC) code for home-based businesses; and
• home-based business operators' fear of legal and zoning consequences.19

To grasp the amount of home-based businesses in the United States, LINK Resources Corporation, a New York-based technology research and consulting firm conducts random telephone surveying of 2,500 American households. The 1993 annual survey lead LINK to conclude that the number of Americans who work from home increased 15% to 7.6 million in 1993.

There are an estimated 12.2 million primary self-employed home-based workers and 12.1 million part-time self-employed homeworkers in the United States. Approximately 800,00 new primary homeworkers began in this work style segment in 1993, but 700,000 discontinued it due to retirement or returning to conventional employment. Approximately 2.3 million new part-time homeworkers began home-based work in 1993, with 1.9 million migrating into full-time jobs or primary self-employment: this resulted in a net gain of 400,000 in this segment in 1993.20

A summary of LINK's findings for four key homeworker segments is given in Table 1. Self-employed homeworkers receive their primary source of income from their home business. Part-time self-employed homeworkers hold multiple jobs and work from home part of the time. Telecommuters are employees who work from home part- or full-time during normal business hours. High tech after-hours homeworkers do company work at home after normal business hours, using personal computers, modems, facsimile machines or extra phone lines.

20LINK Resources Corporation, "1993 Home Office Trend Fact Sheet."
Table 1  
Homeworkers in the United States (1993)

<table>
<thead>
<tr>
<th>Type of American Homeworker</th>
<th>Total Amount (1993)</th>
<th>Percentage of Total 1993 Homeworkers</th>
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<tr>
<td>Primary self-employed homeworkers</td>
<td>12.2 million</td>
<td>29.7%</td>
</tr>
<tr>
<td>Part-time self-employed homeworkers</td>
<td>12.1 million</td>
<td>29.4%</td>
</tr>
<tr>
<td>Telecommuters</td>
<td>7.6 million</td>
<td>18.5%</td>
</tr>
<tr>
<td>High tech corporate after-hours homeworkers</td>
<td>9.2 million</td>
<td>22.4%</td>
</tr>
</tbody>
</table>

Source: LINK Resources Corporation, "1993 Home Office Trend Fact Sheet."

Therefore, in the United States it is estimated that 19.5% of the total workforce (24.3 million / 124.5 million) are self-employed homeworkers on a part-time or full-time basis. In Canada, a 1992 study estimated that "about 23 per cent of working Canadian households are involved in home-based business activity ... [which] represents over [two] million Canadian households."21 Although 1992 Canadian estimate can be considered high when compared with the 1993 American estimate, the increasing incidence of home-based businesses is generally accepted.

In British Columbia, it is estimated that 130,000 of the 220,000 self-employed, work from home.22 In addition, "every year 15,000 British Columbians launch a new home-based business, accounting for more than 50 per cent of all new business starts in the province."23

2.4. Emerging Work Options

In an effort to improve productivity in an increasingly competitive environment, "many companies are looking internationally to other successful companies and adopting management approaches such as just-in-time inventories, decentralization, flatter organizations, business process
streamlining and quality circles.\textsuperscript{24} With their goal of doing more with less, many companies (and government agencies are included here) are considering the basic element that accomplishes any work -- the worker.

Changes in family structure and lifestyles have led to new attitudes on the part of employees about how work relates to the rest of their lives. To help employees and their organizations more equitably balance work and family needs, various work options are being introduced. These emerging work options include flex time, compressed work week, part-time, job sharing, and telecommuting.\textsuperscript{25}

Flex time allows employees to choose their starting and quitting times within limits set by management. The flexible periods are at either end of a 'core time,' during which all employees must be present.

When a standard work week is compressed into fewer than five days, it is termed a compressed work week. The most common are four ten-hour days; three twelve-hour days; or a nine-day fortnight (two-week pay period with five nine-hour days in the first week, and four nine-hour days plus a free day in the second week).

Regular part-time work refers to less than full-time work by employees on an organization's regular payroll. Ideally, this option offers the same degree of job security and a prorated share of the rights and benefits available to the full-time workers.

Job sharing is the concept of two people voluntarily sharing the responsibilities of one full-time

\textsuperscript{24}Kenneth Robertson, "Is Telecommuting for Your Organization?" (MBA Thesis, Simon Fraser University, 1992), 9.
\textsuperscript{25}New Ways to Work, "Flexibility: Compelling Strategies for a Competitive Workplace," 6-7.
job, while salary and benefits are prorated. Job sharing creates regular part-time employment opportunities where there is a need for a full-time position. Unlike regular part-time work, however, job sharing requires a team approach to job responsibilities and allows for more continuity because partners can trade time or fill in for each other.

Telecommuting refers to the employee working at home or at a neighbourhood or satellite office on a regular schedule. Most telecommuting occurs on a part-time basis, one to three days per week. As indicated in Table 1, approximately 7.6 million Americans were telecommuters in 1993: this figure is equivalent to 6.1% of the total American adult workforce in 1993.
3.0. Rationale for Telecommuting

The reasons why telecommuting is a work option that is gaining momentum can be viewed from three perspectives: society's as a whole; the employer's; and the employee's.

3.1. Society's Perspective

The impact of individuals participating in telecommuting programs, if the aggregated scale is large enough, can be felt by society as a whole.

3.1.1. Advantages and Disadvantages of Telecommuting to Society

Telecommuting from home or from neighbourhood or satellite offices can have positive impacts on society as a whole. These advantages from society's perspective include:

- increased energy conservation;
- less highway congestion;
- control of transportation infrastructure costs;
- improved highway safety;
- contribution to healthy business climate;
- greater sense of community; and
- positive impact on local businesses.

With telecommuters able to reduce their daily commuting to work either completely or partially to two to four days per week, society can benefit through increased energy conservation. "In a six-month trial in Phoenix sponsored by AT&T and the State of Arizona, the final report showed [that] 'during the initial six months, 134 telecommuters drove 97,078 fewer miles, avoided generating 1.9 tons of air pollutants ... and endured 3,705 fewer hours of stressful driving time.'"\(^\text{26}\)

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\(^{26}\)Michael J. Dziak, "Why Aren't You Telecommuting?" Online Access, 33.
Related to this partial shortening or elimination of daily commuting for telecommuters, is the effect on the major roads leading to the major employment areas. It is possible to reduce the amount of highway congestion, to control infrastructure costs for construction and maintenance and to improve highway safety. "The public sector receives the largest share of the benefits in the form of avoided transportation infrastructure expenditures."27

In 1991, there were 800,975 Vancouver Census Metropolitan Area (CMA) residents employed in the labour force. Of these workers, 7.2% (57,680) indicated that their homes were their usual place of work, increasing 3.7 times from 1971. Those who had their place of work outside the CMA increased to 3.6% (29,215) and the remaining 89.2% (714,080) worked somewhere in the CMA outside their home.

Figure 1 illustrates the changing work distribution between 1971 and 1991 in the Vancouver Census Metropolitan Area (CMA). For the purpose of analysis, Metropolitan Vancouver has been separated into eight sub-areas: Burnaby/New Westminster; North-East Sector (Coquitlam, Port Coquitlam and Port Moody); South Region (Delta, Surrey and White Rock); the Langley's (Langley City and Langley District); Maple Ridge/Pitt Meadows; North Shore (West Vancouver, North Vancouver City and North Vancouver District); Richmond; and Vancouver.

In 1971, there were 402,245 Vancouver Census Metropolitan Area (CMA) residents who were in the employed labour force. Of these workers, 3.9% (15,675) indicated that their homes were their usual place of work, 2.9% (11,625) had a place of work outside the CMA and the remaining 93.2% (374,945) worked somewhere in the CMA outside their home. Of the 374,945 CMA residents who worked in the CMA, outside their homes, 60% (225,000) had a place of work within the same sub-area as their residence. The remaining 40% (149,945) lived in one CMA sub-

area and worked in another.

Figure 1
Place of Employment for Vancouver CMA Residents
(1971 and 1991)

Source: David Baxter, "Changes in Journey to Work Patterns in Metropolitan Vancouver: 1971 to 1991."

In 1971, there were 240,675 people who lived and worked in the same sub-area (including those who worked at home): this is 62% of the 390,620 residents who had work places within the Vancouver CMA. In 1991, this percentage dropped to 56% (434,440 workers out of a total of 771,760 who lived and worked in the CMA). "At the regional level, the single most important conclusion that can be drawn from comparing the results of the two Census tabulations is that commuting between sub-areas in the [Vancouver CMA] has increased significantly over the 1971 to 1991 period."28

It can be argued that home-based telecommuters create better benefits for society than telework centre telecommuters, due to the elimination of travel. Telework centre telecommuters, however, do not travel as far as they would to their regular office. They do not necessarily need to use the routes used by regular commuters. They may be more likely to use alternative forms of transportation (i.e. public transit, walking, cycling).

The global nature of the modern economy has brought with it an intense wave of competition for all businesses, making increased productivity a prime objective. Telecommuting can contribute to a healthy business climate by providing workers the opportunity to maximize their output and their creativity.

Telecommuting can create a greater sense of community for employees and neighbourhood residents. With more time being spent in the community in which they live (either working from home or from a nearby telework centre), there is a greater chance of social interaction with their neighbours, and telecommuters becoming more committed to their neighbourhood. This attitude could positively influence their neighbours as well. However, "until there [is] a critical mass of [workers in or near their homes], and services supporting them, the [neighbourhood] will hold few opportunities for social contacts."29

With fewer people leaving the neighbourhood on a daily basis to go to work, local businesses can expect a positive increase in their revenues. Existing services should benefit and new work-related services may become established.

If telecommuting becomes more popular, and there is evidence to suggest it will, there have been concerns expressed and they include:

29Penelope C. Gurstein, "Working at Home in the Live-In Office: Computers, Space, and The Social Life of Households" (Ph.D. diss., University of California, 1990), 143.
Increased urban sprawl can result if a coordinated planning approach dealing with growth management is not applied. With the workplace not being in a congested area, for example, employees who telecommute may choose to live further away than if telecommuting was not offered. In metropolitan areas, farmlands could be threatened and demand for improved rural roads and public transportation could result if regional land use controls are not in place.

In many Canadian cities, office vacancy rates are already high due to the prolonged recessionary period. Many people feel that telecommuting will only exacerbate this problem. Based on the changes anticipated in terms of occupations and business operations, perhaps alternative uses for these office buildings are more realistic. Retrofitting these office buildings into other uses (i.e. residential) may be the only solution to addressing the vacancy issue in the short term. In the longer term, however, the market should adjust to changing office needs.

An example of the short term solution occurred in Vancouver, B.C. in the summer of 1993. A downtown office building was marketed as the first example in Canada of a residential condominium converted from a high-rise office building. All units were sold within a matter of hours.

Related to the issue of office vacancy rates, is the concern that telecommuting will make the Central Business District (CBD) obsolete. Regardless of telecommuting, the CBD is becoming more functionally-specialized. Areas in the CBD are emerging that are dominated by, for instance, financial institutions, producer services and tourism and convention facilities. It could be

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30 Allan G. Bortel, "The Un-Real Estating Of Corporate America," Professional Builder, 22.
31 Thomas Hutton, "City Profile: Vancouver," 10.
argued that the trend towards telecommuting is actually a benefit to the CBD in that less congestion will allow more efficient utilization of scarce urban land resources.

3.2. Employer's Perspective

Employers are focusing on optimizing productivity and reducing costs, some are also trying to respond to the many challenges facing their employees. Telecommuting is one work option that may be able to fulfil these goals.

3.2.1. Occupational Change

Canada and other industrialized countries are experiencing processes of structural change in the economy. The most significant change has been the shift out of manufacturing industries, into an information society. "While the shift from an agricultural to an industrial society took 100 years, the present restructuring from an industrial to information society took only two decades."32

One of the reasons for restructuring (or shifting away from 'traditional' industries) is due to globalization. Globalization -- a near borderless world where trade and investment flow freely -- has resulted in increased competition. The impact of this increased competition is most evident in manufacturing, where "the biggest change in terms of share of total jobs has hit the unskilled."33

The lower-skill jobs in manufacturing assembly operations are migrating to where labour is cheaper. In Canada, and other advanced countries, the era has ended when many people with modest education earned handsome wages in factories. The western industrialized countries are

32John Naisbitt, Megatrends, 9.
changing to more high-tech and less high-labour. "As a proportion of the working population, blue-collar workers have ... [during the past 15 years] decreased to less than a fifth of the American labor force ... and in 2010 ... they will constitute ... a twentieth of the total."34

3.2.2. Business Reengineering

Businesses are under considerable pressure to increase productivity and lower costs. The 1984 Royal Commission on the Economic Union and Development Prospects for Canada concluded "that the key objectives of improving productivity were world-class technology, improved labour-management relations, and entrepreneurship and industrial innovation."35

To generate major improvements in business benefits, reengineering efforts are being conducted around the world. The goal of business reengineering is to make revolutionary process improvements. A recent study of reengineering projects in over 100 companies "identified two factors -- breadth and depth -- that are critical in translating short-term, narrow-focus process improvements into long-term profits."36 Breadth refers to the process of improving performance across the entire business unit. Depth refers to the redesign penetrating to the company's core, by making profound changes to six critical organizational elements. These elements are:

- roles and responsibilities;
- measurements and incentives;
- organizational structure;
- information technology;
- shared values; and
- skills.37

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34Peter F. Drucker, Managing for the Future: The 1990s and Beyond, 132.
37Ibid.
There are some recurring themes that are frequently encountered in reengineered business processes. "The most basic and common feature ... is the absence of an assembly line; that is, many formerly distinct jobs or tasks are integrated and compressed into one." Another feature is that decisions which may have formerly been made by the managers are now being made by the workers. A third characteristic is that "work is performed where it makes the most sense." Business reengineering, therefore, results in dramatic changes. Telecommuting is one example of such change.

3.2.3. Advantages and Disadvantages of Telecommuting to the Employer

"The global nature of the modern economy has brought with it an intense wave of competition for all businesses, making increased productivity a prime objective. The business world has come to realize the importance of maximizing not just the output of workers, but also their creativity and the level of quality and customer service in their work." For the companies and government agencies that implement a telecommuting program, the advantages accrued to the employer can include:

- reduced staff turn-over and absenteeism;
- improved recruiting;
- higher employee morale;
- reduced overhead;
- good public relations value; and
- improved quality and quantity of work output.

Employers are highly motivated to retain their better employees because of the significant costs of recruiting and training. Providing greater flexibility in terms of where and when people work, by implementing programs such as telecommuting, can be an effective tool for retaining valued

38Michael Hammer and James Champy, Reengineering the Corporation, 51.
39Ibid., 56.
40USA, Department of Transportation, "Transportation Implications of Telecommuting," 10.
employees. Telecommuting can be a selling point for workers whose lifestyle or family needs are incompatible with daily commuting, particularly long distance.

In addition to reduced staff turn-over, studies indicate that telecommuting has also reduced absenteeism. One American study (Pacific Bell) reports "that telecommuters exhibit 25 per cent less absenteeism than do employees who work in their Central Business District offices."41

Telecommuting programs have demonstrated that telecommuting increases employee morale. This improved morale has a positive affect on productivity improvements and absenteeism reductions.

Telecommuting provides the employer an opportunity to save on office space costs, if the central office space is reduced in size. This is possible because an organization with telecommuters will rarely have all staff in the same office facility at the same time. Thus, if the organization created a staggered schedule for telecommuters, space could be saved through non-territorial office strategies.

With telecommuting being one reason employees stay with the organization, it can also be a reason to want to join. The option to divide time between working remotely and working in the central office can be important where lifestyle, family or other similar issues are vital to a valuable prospective employee. In addition, telecommuting provides access to a larger labour pool, including handicapped, elderly, and geographically remote persons.

Hiring the otherwise unemployed or under-employed worker with limited mobility or access to reliable transportation, has positive value in terms of public relations for the employer. In

41USA, Department of Transportation, "Transportation Implications of Telecommuting," 35.
addition, reducing the amount of commuting required of the employees is positive in that this contributes to the general societal goals of reductions in pollution, road congestion and gasoline consumption.

Performance of creative work can benefit from the employee having greater flexibility in the work situation and scheduling. Most studies have shown that the most important characteristic of telecommuting for an employer is the increase in productivity from the telecommuter -- an increase in the range of 15-30%.

This productivity increase is attributable to several factors:

1. Telecommuters tend to work more within the same number of hours per day than do workers in the central office;
2. Telecommuters work at a pace that is best for them, without having to deal with peer pressure for being too dedicated;
3. Telecommuters take less sick leave; and
4. Telecommuting is increasingly built around using technology -- that in itself adds to the productivity of the telecommuter.

The productivity of telecommuters was examined in the 1993 final evaluation of the BC Systems Corporation telecommuting pilot in Victoria, British Columbia. The BC Systems Corporation is the province's technology provider and the pilot involved twenty home-based telecommuters and fourteen satellite office telecommuters.

The BC Systems Corporation telecommuters estimated that their productivity increased on their telecommuting days and also on their regular office days, resulting in an overall productivity improvement. These improvements were also recognized by the supervisors, however, not surprisingly, the latter estimates were somewhat lower. Table 2 illustrates the productivity increase.

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42 Lis Fleming, The One-Minute Commuter: How to Keep Your Job and Stay at Home Telecommuting, 46.
improvements estimated by the telecommuters themselves (satellite and home-based) and their supervisors. When the estimates of the telecommuters and their supervisors are aggregated and averaged, the weighted grand mean improvement in productivity was 20% on telecommuting days and 13% overall.\textsuperscript{43}

### Table 2

**Productivity Measurements of Telecommuters: B.C. Systems Corporation**

<table>
<thead>
<tr>
<th>Questionnaire Respondents</th>
<th>Productivity Improvements on Telecommuting Days</th>
<th>Overall Productivity Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Telecommuters:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interim</td>
<td>27%</td>
<td>18%</td>
</tr>
<tr>
<td>Final</td>
<td>28%</td>
<td>19%</td>
</tr>
<tr>
<td>Satellite Office Telecommuters:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interim</td>
<td>27%</td>
<td>12%</td>
</tr>
<tr>
<td>Final</td>
<td>15%\textsuperscript{a}</td>
<td>12%</td>
</tr>
<tr>
<td>Supervisors:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interim</td>
<td>17%</td>
<td>10%</td>
</tr>
<tr>
<td>Final</td>
<td>18%</td>
<td>11%</td>
</tr>
<tr>
<td>Weighted Grand Mean:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interim</td>
<td>22%</td>
<td>13%</td>
</tr>
<tr>
<td>Final</td>
<td>20%\textsuperscript{b}</td>
<td>13%</td>
</tr>
</tbody>
</table>

**Notes:**

\textsuperscript{a}: The drop in productivity for satellite office telecommuters is attributable to the technology problems experienced at the satellite office.

\textsuperscript{b}: The weighted grand mean on telecommuting days was calculated as follows:

\[(20 \text{ home telecommuters} + 68 \text{ total telecommuters and supervisors} \times 28\%) + [(14 \text{ satellite telecommuters} + 68) \times 15\%] + [(34 \text{ supervisors} + 68) \times 18\%] = 20\%

Source: Ken Robertson and Walter Muir, "BC Systems Telecommuting Pilot Final Evaluation."

However, disadvantages of telecommuting from the perspective of the employer can include:

- start-up and operating costs;
- change in basic organizational practices;
- possible increased need for computer resources;
- difficulties in communicating with workers;
- lack of organizational experience in remote supervision and management by objectives;

\textsuperscript{43}Ken Robertson and Walter Muir, "BC Systems Telecommuting Pilot Final Evaluation," 17.
• meeting urgent assignment deadlines;
• union opposition;
• security concerns; and
• setting of a precedent.

The cost of implementing telecommuting can include the following:

1. equipment purchasing or leasing, particularly telephone lines, personal computers and office furniture;
2. additional office facilities in neighbourhood or satellite offices; and
3. training programs for the telecommuters and their supervisors.

In the BC Systems Corporation's recent pilot telecommuting program, the operating cost per home telecommuter was estimated at approximately $5,300 per year and the cost per satellite telecommuter was estimated at approximately $8,900 per year.44

With workers performing some or all of their tasks from a remote location, it may be necessary to change the basic practices of the organization. For instance, regularly scheduled meetings may be necessary rather than chance get-togethers.

While not all tasks done remotely require computer equipment, the majority of telecommuters will increasingly rely on technology. Assuming this trend to be the norm, it is likely that there will be an increased need for additional computer resources. While more people will rely on technology, they will not necessarily be capable of resolving technology difficulties. Additional information technology personnel to be available on an on-call basis may, therefore, be necessary.

Telecommuters may choose to work non-traditional hours in order to better accommodate other obligations such as family. If the working hours of the telecommuter do not correspond with the

hours of his/her supervisor, difficulties may be experienced in communicating with the worker. This problem can be alleviated, however, if there is an agreement between the two parties to provide some overlap in working hours (i.e. core hours) between the telecommuter and the supervisor.

While some supervisors may feel that managing telecommuters is no different from managing in-office employees, other supervisors may experience difficulties. Management of remote workers may be beyond the capabilities of managers who rely on frequent visual contact to reassure themselves their staff are really working. The successful management of telecommuters requires trust and the development of new supervisory methods. For example "management by objectives," which focuses on the product rather than the process, must replace the practice of direct visual observation for telecommuting to be successful. It should be noted that management skill is not enough to ensure successful telecommuting programs. "Many other attributes, including trust, voluntary participation, upper management support, and employee enthusiasm are reported as important to success."45

Employers often are concerned about the effectiveness of telecommuters in handling urgent assignment deadlines. In every office, situations arise which need to be addressed immediately and the concern is that workers in remote locations will be unable to assist. Through the use of the telephone, facsimile machine, personal computer and modem, it is possible to meet these deadlines without face-to-face contact. The ability to deal with tight deadlines may, in fact, be easier for telecommuters, due to fewer interruptions.

Telecommuting, when implemented, can substantially affect how unions go about representing their members. When telecommuting started to become more popular in the early 1980s, trade

45Lauren Mavis Speeth, "The Attributes of Successful Managers of Telecommuters and Successful Telecommuting Programs" (Ph.D. diss., Golden Gate University, 1992), 110-111.
unions expressed concern. The main areas of concern expressed by the trade unions are as follows:

1. fragmentation of the workforce;
2. exploitation of the telecommuter;
3. social isolation of telecommuters;
4. ability to stop telecommuting;
5. employee’s expenses associated with telecommuting; and
6. potential lack of promotional opportunities for telecommuters.40

The British Columbia Government Employees' Union (BCGEU) recently cooperated with BC Systems Corporation in Victoria in establishing a telecommuting pilot. Prior to signing the memorandum of agreement for the project, the BCGEU required that several concerns be addressed. One was the status of telecommuters: they had to remain employees and receive the same pay and benefits regardless of their work location. Other areas of concern were insurance, liability and ownership of equipment.47

A major concern from the perspective of the employer about telecommuting is security. Security and confidentiality issues present many challenges: lack of institutional control over the workplace; and the greater use of technology will increase the risks of theft, forgery, and untimely disclosures. One security concern is the malicious or unintentional tampering of information on the organization's computers. Many safeguards can be instituted to reduce security violations, however, there are no guarantees security will not be threatened. A second security concern is access to customer information. Strict policies can be put in place to reduce the likelihood of unauthorized people gaining access to confidential information but, again, there are no guarantees

46Vittorio Di Martino and Linda Wirth, Conditions of Work Digest.
when the employee is working from a remote location.

Employers are often concerned about setting a precedent. If some employees are allowed to telecommute and there is great enthusiasm about this work option, other employees will likely pressure management to expand the program. The disadvantage is that telecommuting will not work for all jobs. In addition, although a job may be conducive to telecommuting, not all employees are similarly suitable.

3.3. Employee's Perspective

Due to the many challenges facing the modern employee, such as work and family obligations, career development and stressful lifestyles, flexible work options like telecommuting are becoming more and more desirable.

3.3.1. Changing Family Structure

Canada's typical family structure is changing. Changes in the structure of families have had a major effect in determining what an employee wants from a job. In the 1960s, the nuclear family was typical: the father worked usually outside the home and the mother stayed home to care for the children. The percentage of two-adult families has decreased to 87% from 93% in 1961. Figure 2 illustrates the steady trend in Canada toward fewer two-parent families. This increasing number of single-parent families (13% in 1991) has implications on employee needs, and flexible work options can provide some assistance.
For today's two-adult families, the incidence of the husband only working has noticeably dropped from more than three-quarters (77%) in 1961 to less than one-quarter (23%) in 1991: these numbers include common-law relationships and only reflect families where at least one member is in the employed labour force. The likelihood of both adults working, in a two-adult family, has increased from 20% in 1961 to 51% in 1991.

Figure 3 illustrates the increasing proportion of double income-generating families between 1961 and 1991. In 1961, 20% of all two-adult families in the labour force were both working, whereas in 1991, this proportion increased to 73%. Again, the decline in the numbers of one adult in the family not working has implications on the family, particularly families with children.
The result of more couples working has contributed to the changing composition of Canada's workforce. Figure 4 illustrates the changing distribution of the total Canadian workforce, by sex, between 1961 and 1991. In 1961, almost three-quarters (72%) of the Canadian workforce were males, whereas in 1991 this proportion dropped to just over one-half (55%).
"Work schedules are a critical factor that structures the time available for parent-child, couple, and 'whole family' interactions, potentially affecting the quality of life and children's socialization."48 Table 3 illustrates how the flexibility of work schedules is increasingly important due to the rising participation rate of mothers in Canada's labour force between 1976 and 1990. In 1976, 1,338,000 mothers of children under the age of 16 were in the labour force; in 1990, this figure increased almost 61% to 2,153,000.

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48 Donna S. Lero and others, Canadian National Child Care Study: parental work patterns and child care needs, 101.
Table 3
Labour Force Participation of Canadian Mothers
(1976 to 1990)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>&lt; 3 years</td>
<td>282,000</td>
<td>419,000</td>
<td>511,000</td>
<td>560,000</td>
</tr>
<tr>
<td>3-5 years</td>
<td>256,000</td>
<td>306,000</td>
<td>369,000</td>
<td>393,000</td>
</tr>
<tr>
<td>6-12 years</td>
<td>583,000</td>
<td>696,000</td>
<td>751,000</td>
<td>...</td>
</tr>
<tr>
<td>6-15 years</td>
<td>800,000</td>
<td>980,000</td>
<td>1,083,000</td>
<td>1,200,000</td>
</tr>
<tr>
<td>Total with Children &lt; 16 Years</td>
<td>1,338,000</td>
<td>1,705,000</td>
<td>1,963,000</td>
<td>2,153,000</td>
</tr>
</tbody>
</table>

Source: Donna S. Lero and others., Canadian National Child Care Study: parental work patterns and child care needs, 23.

3.3.2. Advantages and Disadvantages of Telecommuting to the Employee

From the telecommuter's perspective, telecommuting from a neighbourhood office, satellite office, or from home has the following advantages:

- flexibility and empowerment in the workplace;
- reduction of commuting time and travel stress;
- cost savings on wardrobe and vehicle-related;
- proximity to family and community;
- autonomy and control over work conditions and schedules;
- ability to better balance work and home lifestyles;
- improved work environment; and
- improved quality of life.

Probably the most significant advantage for employees who telecommute is personal freedom in terms of flexibility and empowerment in the workplace. Most telecommuters can set their own hours and adjust their work days to best fit their peak hours of mental alertness. In addition, when telecommuting, there are no expectations as to what is appropriate work attire.
"Long distance commuting on congested roads has adverse effects on blood pressure, frustration tolerance, short term memory, mood and job satisfaction."⁴⁹ By limiting the days required to commute to the central location, telecommuters who work from home or from telework centres enjoy the reduction in commuting time. By eliminating or reducing the amount of rush hour commuting, an individual's travel stress is reduced.

"There are some tangible, cost saving advantages to telecommuting. The primary cost saving is the money that the employee currently spends on commuting to the central office."⁵⁰ For those who drive to work, savings will be on vehicle costs (parking, fuel and maintenance) and for those who take public transit, savings will be on transit fares. Another area of cost savings enjoyed by telecommuters is related to food and clothing. Regular lunches at the company cafeteria or local restaurants are reduced when working from home. The need for expensive office attire can also be reduced along with associated dry cleaning costs, when working from home or from telework centres where attire is more casual.

The costs and benefits for individual telecommuters were examined in the 1993 final evaluation of the BC Systems Corporation telecommuting pilot in Victoria, British Columbia.⁵¹ There were no costs incurred by the fourteen satellite telecommuters. There were costs for the twenty home-based telecommuters in terms of set-up costs and home energy costs (i.e. heating and power usage). The total yearly benefit accrued to the average satellite telecommuter was estimated at $1,466. This figure was based on the average satellite telecommuter's estimated vehicle-related savings (fuel, maintenance and parking) and value of personal time saved. The average satellite telecommuter had been traveling to and from work in a single-occupancy vehicle (67% of the

pilot group). The net yearly benefit accrued to the home telecommuter was estimated at $1,821.

Many telecommuters appreciate the proximity to family and community when working from home or from a nearby telework centre. Telecommuters can spend more time with their families and, therefore, have a greater sense of satisfaction with their overall lives.52

It must be stressed that, while working from home cannot be a substitute for child care, avoiding or reducing the regular commute will also reduce the amount of time the child spends in child care: this is true for all types of dependent care.

Related to proximity to work, telecommuters can better balance work and home lifestyles. A recent study concluded that because "the labour force of the 1990s and beyond will be dominated by employees who share at least some responsibility for the care of family dependants"53 organizations cannot afford to ignore the issue of balancing work and family demands. This study was conducted by a team from Carleton University, University of Ottawa and the University of Western Ontario and consisted of a survey distributed to over thirty Canadian private sector companies. To help employees better balance the work/family interface, six recommendations are made in the report and the first two include telecommuting:

1. provide greater work-time flexibility;
2. provide greater work/location flexibility;
3. educate employees on issues of work-family conflict;
4. make a commitment to promote women;
5. provide flexible and complete benefit packages; and

Telecommuters enjoy the autonomy and control over work conditions and schedules. Choosing how one's workspace is organized and one's work schedule, gives a worker satisfaction and the feeling of being his or her own boss.

Telecommuters often cite the advantage of telecommuting being an improved work environment. Telecommuters experience fewer distractions, less environmental noise, and less job-related stress. They are also able to avoid office politics and when working from home, can exert control over their physical environment, i.e. by adjusting the temperature to their liking, opening windows, etc.

Overall, telecommuters experience an improved quality of life. By enjoying the flexibility of working when and where it is most convenient, other factors of their lives can be improved.

However, some employee concerns about telecommuting include:

- tendency to overwork;
- concern regarding electronic monitoring;
- lack of adequate home space;
- lack of promotions;
- isolation from colleagues; and
- conflicts between family and work roles.

There is a tendency for telecommuters to overwork. This may be because telecommuters are attempting to prove that this work option was a good management decision and are working harder to justify telecommuting or because there is no one to invite them to take a break. In the case of the home-based telecommuters, overworking may be a result of not being able to get away

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54 Ibid., 75-79.
from the office.

Although the supervisors are not visible, there is a concern held by some telecommuters about being electronically monitored. It is a simple procedure to determine how long an employee was signed on to the computer network and how many transactions were undertaken. This fear can bring about distrust and could threaten the success of the program.

Adequate home space is necessary for successful home-based telecommuters. The workspace should be comfortable and there should be sufficient storage space. Ideally, the workspace should be separate from the living space: this separation should be physical to provide the worker psychological separation from the home. However, if a separate room is not available, the workspace should have boundaries and "should be located to minimize visual, auditory and physical access from the private areas of the home."55

Working remotely could result in a reduced opportunity for promotion. Telecommuters are not always visible to management and, therefore, can be easily overlooked for promotion. In this situation, the telecommuter is perhaps an example of out of sight, out of mind.

"Social isolation is considered to be the greatest disadvantage of telecommuting and this is the main reason many people give for opposing telecommuting."56 The home telecommuter is the one who is most isolated. For this reason, many telecommuters prefer to work from telework centres or telecommute only one to three days per week.

For home-based telecommuters, conflicts between work and family roles are a concern. "When

these conflicts cannot be resolved, the merging of roles and the merging of spaces cause disruptions in other home activities."\textsuperscript{57}

\textsuperscript{57} Penelope C. Gurstein, "Working at Home in The Live-In Office: Computers, Space, and The Social Life of Households," (Ph.D. diss., University of California, 1990), 40.
4.0. Implementation of Telecommuting

Based on LINK Resource's annual national Work-at-Home Survey, "company employees working at home at least part of the time during normal business hours now total 7.6 million."58 Since telework centre telecommuters are not included in this survey, the total number of telecommuters (as defined in this paper) will be greater than 7.6 million. Similar annual surveys are not conducted in Canada, however, if even a slightly smaller proportion of Canadian workers were home-based telecommuters (i.e. 5.75% rather than 6.1% in the U.S.), there could be an estimated 738,150 Canadian telecommuters.59

LINK Resources found that three-fourth's of all telecommuters are information workers. "Managers, salesworkers and professional specialty occupations ... account for 3.8 million of the total 7.6 million telecommuters."60

4.1. Suitable Jobs or Tasks

It is commonly assumed that only people who spend most of their working day using a personal computer are suited to telecommuting. Although this assumption may be the case for the majority of telecommuters, telecommuting can apply to many jobs. The key to determining jobs with telecommuting potential is to dissect the jobs into individual tasks. Once the tasks have been identified which could be performed from a remote location, the ability of the specific employee to be effective remotely must be reviewed.

There are at least four important characteristics of tasks that make the task suitable for

59 Based on the 1991 Census, there were 12,837,675 people employed in Canada.
60 Ibid.
telecommuting and these tasks are as follows:

1. Task has minimal physical requirements of other labour and capital inputs;
2. Task outputs can be defined and measured unambiguously without on-site supervision;
3. Task requires concentration; and
4. Task requires little unscheduled face-to-face contact.\(^{61}\)

Tasks which rely on the physical output from other employees that are not easily transported to a remote location do not lend themselves easily to telecommuting. In addition, tasks which require access to specialized capital equipment are also difficult to perform remotely. With advancements in technology, however, what could not be done remotely ten years ago, can be performed remotely today. For instance, computer aided drafting was only available on large central computers ten years ago. Today, it is available on personal computers at a reasonable cost.

In order for managers to evaluate the progress of tasks being performed remotely, telecommuting tasks must result in outputs that can be clearly defined and measured. These telecommuting task measurements should be agreeable to both the manager and the telecommuter prior to the commencement of the assignment. The review process should be carried out throughout the activity.

Tasks that are ideal for telecommuting are those that require concentration, such as report writing, calculations, and drawing. In the central office, concentrating for extended periods of time is often difficult due to frequent interruptions. A commonly-cited problem with the central office "is the open office plan with partitions, rather than walls, to separate workspaces."\(^{62}\) At a

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\(^{61}\)Kenneth Robertson, "Is Telecommuting for Your Organization?" (MBA Thesis, Simon Fraser University, 1992), 15.

remote location, even with only partitions, interruptions decrease considerably and productivity and creativity can increase.

A very important characteristic of a good telecommuting task is that required face-to-face meetings can be scheduled. Communication is not cut off when working remotely but only the face-to-face contact. In the near future, video phones will be more readily available for persons on the phone to see each other. Presently, communication with the telecommuter working remotely can be achieved via electronic mail, telephone, and facsimile.

4.2. Government Involvement in Telecommuting Programs

Governments have played a significant role in the encouragement of telecommuting as a work option. The forms of encouragement have varied. In Great Britain, the government has assisted private businesses in the recruitment of home-based employees. In the United States, the Clean Air Act has legislated large cities to address the degradation of the environment. Telecommuting is one recommended response. In Canada, governments are developing telecommuting programs for their own employees, which in turn may set an example for the private sector to follow.

4.2.1. Great Britain

In 1982, Britain's Department of Trade and Industry initiated a pilot home-based telecommuting program, called the Remote Work Units Project, which transformed the disabled into enabled. The project involved assisting a wide range of employers in recruiting employees who, because of mobility restrictions, could work only from home. Phase One of the project started with six people employed from home and during the following two years, fifty-eight more home-based employees were added.

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workers were added.

Between 1984 and 1986 a second phase of the project ran and was comprised of another forty workers. "The aim of this second phase was to develop guidelines for a permanent scheme whereby hundreds, and even thousands, of disabled people could eventually be helped to find fulfilling employment from home." Since 1987, the Manpower Services Commission has been responsible for implementing this service on a nation-wide basis.

4.2.2. United States

The United States federal government has recognized that telecommuting should be encouraged as it may assist in satisfying the legislative mandate to improve air quality. The Clean Air Amendment Act (CAAA) is focused on achieving higher levels of air quality, particularly in the more heavily polluted urban regions, and is a major motivation for public sector interest in telecommuting in many areas. Deadlines are set for reduction of pollution in over 100 major cities, which in some cases may require actually reducing auto travel. In response to the CAAA, the states of Arizona, California, Colorado and Washington (among others) have implemented telecommuting.

On February 11, 1994, Arizona's House Bill 2001 came into effect. This state bill calls for a five per cent reduction in employee single-occupancy vehicle trips in the first year and a ten per cent reduction in Maricopa County (which includes Phoenix). In the second to fifth years, an additional five per cent reduction (and ten per cent for Maricopa County) is required. The law covers employers with one hundred or more employees, however, in Maricopa County the threshold is fifty employees. One requirement of the employer trip-reduction plan involves a

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64 Ibid., 27.
65 USA, Department of Transportation, "Transportation Implications of Telecommuting," 10-11.
telecommuting program that includes at least five per cent of the employees at least one day a week. With an estimated 500,000 employees in Maricopa County firms with fifty or more employees, this five per cent telecommute requirement translates to 25,000 telecommuters every day.66

The State Assembly Bill 374 in California proposes "a tax credit to employers implementing telecommuting programs, provided participants telecommute three or more days per week."67 In Southern California, the Air Quality Management Plan for the South Coast Air Basin includes a measure designed to eliminate twenty per cent of regional work trips through telecommuting. The City of Los Angeles has established "at least 3 satellite offices as one of the goals of its telecommuting pilot project."68

In response to the State of Colorado's Bill 1178 (which outlines an eighteen-month travel reduction program) and to fulfill a leadership role, the City and County of Denver began its telecommuting pilot program in June 1992. Other incentives Denver offered to employees to reduce work travel included: alternate modes of travel (bus, carpool, vanpool, bicycle), adjustable work schedules and a guaranteed ride home through their Guaranteed Ride Home Program.

To encourage other organizations to consider telecommuting, on August 19, 1992, the City and County of Denver sponsored the 1992 Colorado Telecommuting Conference. The conference was the innovation of the City and County of Denver's Travel Reduction Program Office and the Colorado Advanced Technology Institute. The purpose of the conference was to challenge participants to "think through the strengths and drawbacks of telecommuting" and the conference

67 USA, Department of Transportation, "Transportation Implications of Telecommuting," 7.
was open to anyone interested.\textsuperscript{69}

In response to the state of Washington's trip reduction statute, in October 1990, the Washington State Energy Office (WSEO) began a Seattle-area telecommuting pilot with 283 telecommuters from thirteen public and private sector organizations. This pilot had a strong research focus and among the areas studied were:

1. effects on travel patterns and energy usage;
2. changes in job performance and job satisfaction;
3. suitability of the technological infrastructure; and
4. cost savings generated by telecommuting and telework centres.\textsuperscript{70}

The final evaluation report found that there was increased productivity and increased skills observed by both the telecommuters and their supervisors. It was also reported that each of "the telecommuters reduced their total number of commute trips by about 26 trips per year; the home-based telecommuters reduced their vehicle miles traveled by 1,386 [miles or 2,230 kilometres] on average, and saved 46 gallons [174 litres] of gasoline."\textsuperscript{71}

4.2.3. Canada

Canada's Treasury Board Secretariat Personnel Policy Branch has initiated a telework policy for 200,000 federal government employees. The policy came about as a result of addressing ways to make life better for employees who are faced with "minimum salary increase, [having to do] more

\textsuperscript{69}City and County of Denver, "Telecommuting Meeting the Management, Environmental, and Family Needs for a Charging Business Environment," 1.
with less and constant downsizing."72 The Treasury Board approved the telework pilot project on August 24, 1992, for a period of three years. With the aim of allowing employees to work at alternative locations and thereby achieving a better balance between their work and personal lives, all departments are encouraged to consider applying the telecommuting concept where it is economically and operationally feasible to do so.

Another Canadian federal government example is the Ontario Region of the Canadian Department of Communications' telework centre in Burlington, Ontario.73 Burlington is located fifty kilometres (thirty-one miles) from downtown Toronto. The average one-way public transit trip from Burlington to the downtown Toronto office is one and one-half hours and it is longer for private vehicles during peak periods. In an effort to address the high staff turnover and resulting high staffing and training costs, the Burlington Telework Centre was opened in November 1992. The telework centre consists of twenty telecommuters and indications are that this work option is assisting in retaining staff.

In the summer of 1991, the BC Systems Corporation's Environmental Awareness Team recommended several activities to support the Corporation's principle of environmental responsibility. Included in this plan was a recommendation to offer telecommuting to workers on a part-time basis. On December 1, 1992, BC Systems Corporation began its first telecommuting pilot. The pilot consisted of twenty employees for home-based telecommuting and fourteen for satellite office telecommuting. Participation in the pilot was open to most of the 1,100 employees of BC Systems Corporation: the information technology provider for the B.C. government. The majority of the telecommuters (79%) are unionized employees and come from a variety of Divisions within BC Systems Corporation and from a wide range of jobs.

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73"Department of Communications -- Burlington Telework Centre," Telework Canada, Summer 1993, 1.
The telecommuting pilot plan included approximately five months of preparation activities (development of policies, technology strategy, training, etc.) followed by a ten month pilot. The satellite office was established within a strip mall in the Victoria suburb of Langford, approximately thirteen kilometres (eight miles) from the BC Systems Corporation headquarters. The home-based and satellite office telecommuters were equipped with all necessary technology and equipment. Each of the seventeen office stations was designed to be shared by two or more telecommuters.

The pilot demonstrated that telecommuting is a viable work option for BC Systems Corporation, with financial and environmental benefits and improved job performance. Based on these results, BC Systems has formalized telecommuting as an approved part-time, voluntary work option available to qualified employees.

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5.0. Municipal Government Role in Telecommuting

Telecommuting is a work option that is increasingly being implemented. Although exact figures are unknown, evidence of this work option is more prevalent in the United States for a number of reasons including legislation to address pollution. In Canada, the incidence of telecommuting is increasing, with both organizations and employees seeing the benefits of working remotely. These benefits and concerns of telecommuting have been reviewed from the perspective of the employer, the employee and society.

From the employees' perspective, a better balance between their work and personal lives is sought. The number of one-parent families is increasing and where there are two-parent families, it is more common for both parents to be working. With the desire to improve one's quality of life, the daily long-distance commute is no longer acceptable. Telecommuting, even on a part-time basis, is one work option that is desirable for many.

The advantages that an employee can enjoy if given the opportunity to telecommute can include:

- flexibility and empowerment in the workplace;
- reduction of commuting time and travel stress;
- cost savings on wardrobe and vehicle-related;
- proximity to family and community;
- autonomy and control over work conditions and schedules;
- ability to better balance work and home lifestyles;
- improved work environment; and
- improved quality of life.

To maintain a competitive advantage, employers are seeking more productive ways of performing tasks. Jobs are changing. The most significant occupational shift has been out of the basic production industries, into services and technology-intensive and value-added manufacturing. With the assistance of technology, an increasing number of jobs can be performed anywhere,
For organizations that permit their employees to telecommute, the advantages accrued to the employer can include:

- improved quality and quantity of work output;
- reduced staff turn-over and absenteeism;
- improved recruiting;
- higher employee morale;
- reduced overhead; and
- good public relations value.

From a societal perspective, some positive effects of telecommuting include:

- increased energy conservation;
- less highway congestion;
- control of infrastructure costs for construction and maintenance;
- improved highway safety;
- contribution to healthy business climate;
- greater sense of community for employees and neighbourhood residents; and
- positive impact on local businesses.

5.1. Is Telecommuting Worthwhile?

In a general sense, it has been demonstrated that telecommuting is worthwhile. There are net benefits to employees, employers and society. Municipal governments must, therefore, become aware of the increasing incidence of telecommuting, its possible advantages to the municipality, and the resulting impacts on the operation of the municipality.
5.2. Municipal Government and Telecommuting

Telecommuting can assist municipalities in meeting certain objectives, such as increasing employment areas and decreasing transportation infrastructure costs. To reach these objectives, however, municipalities must take a 'pro-active' role in the evolution of telecommuting in their community.

5.2.1. Benefits of Telecommuting to Municipalities

Municipalities can benefit not only from their own employees telecommuting, but also from their residents' telecommuting. The benefits municipalities can expect from a greater incidence of telecommuting within their boundaries, include the following:

- cost savings on transportation infrastructure;
- community development;
- decreased breaking and entering crimes;
- consideration in emergency preparedness planning;
- tax base improvements; and
- information highway leadership role.

When telecommuting is implemented, "the public sector [i.e. the taxpayer] receives the largest share of the benefits in the form of avoided transportation infrastructure expenditures."75 A 1991 study of the benefits and costs of telecommuting in Greater Vancouver estimated that through the implementation of telecommuting, up to $2.38 billion in transportation infrastructure costs could be avoided over a ten year period.76

Telecommuting can assist in creating friendly communities. With fewer residents leaving their

76 Ibid., 59.
community on a daily basis to go to work, the neighbourhood can become more of a focus. More community awareness coupled with greater participation in community events may result in bringing the community closer together.

It has been demonstrated in Japan, that "middle-aged businessmen [who have traditionally moved] like pistons between their downtown offices and their homes have had virtually no point of interplay with their local community." To bring about greater awareness of their community, telework centres are being viewed as important "venues of exchange between companies and local communities." With workers staying within the community to work, it is anticipated that these new citizens can assist in creating a better community.

An added benefit with more people staying within the community to work and, thus, possibly providing more eyes on the street is perhaps a decrease in breaking and entering-type crime. With more activity in the local shopping areas due to a telework centre or more people at home working, the deterrent to crime may be created.

Telecommuting should be considered by municipalities in emergency preparedness planning. The recent Los Angeles earthquake (see section 1.0 Purpose) demonstrates the need for remote office locations. With people unable to travel to work at all or within a reasonable length of time, satellite offices were immediately in great demand. "More than 30 companies [were] lining up to use a Valencia-based telecommuting center that [had not] yet opened its doors." One California-based company had just implemented their telecommuting plan when the earthquake struck and "within hours of the earthquake all the company's far-flung workers were up and

78ibid.
running and able to transmit data." 80

Other emergency situations, such as floods or snow storms, can take advantage of telecommuting. Tasks can still be accomplished, even though the central office is inaccessible. Workers can operate out of homes, hotels, or telework centres and stay connected to the central office with telephones (portable if necessary) and personal computers.

With the establishment of telework centres, municipalities can receive tax revenues from companies that might not have otherwise located there. However, as is recommended in section 10.0, this benefit may be more long term, as tax breaks may be required as an incentive to initially establish the telework centre.

Telecommuting can assist municipalities in positioning for the information super highway and new technology. The information super highway refers to the ability to access information from around the world, remotely. Telecommuting is a way of preparing for the super highway and municipal officials must recognize these technological possibilities. The world is changing due to technology. "With over 90% of jobs located outside the central business districts in most American cities, riding the train downtown does not present a workable alternative." 81

5.2.2. Areas To Be Addressed by Municipalities

It appears that there is significant benefit in municipalities taking a leadership role in the evolution of telecommuting. There are at least six areas that municipal officials need to analyze and possibly to implement changes to actively support, encourage, and evolve telecommuting within their community. These areas include the following:

80"Quake has Californians tuning in to telecommuting," The Ottawa Citizen, January 21, 1994, F3.
1. Land use regulations;
2. Land development application review procedures;
3. Recreation program planning;
4. Municipal infrastructure planning;
5. Municipal marketing plans; and
6. Municipal employee telecommuting program.

The remainder of this paper will examine how a specific municipality, the City of Surrey, B.C., can address these areas.

5.3. City of Surrey, Case Study

Surrey is a very fast-growing city located in the Lower Mainland of British Columbia. Between 1986 and 1991, Surrey's population grew 35% from 181,447 to 245,173. With Vancouver having the highest population in British Columbia, (476,378 in 1991), Surrey has the second highest.  

Surrey is almost 130 square miles in area and is located thirty-two kilometres (twenty miles) and one river crossing away from Vancouver (see Map 1). In 1991, 113,515 (46%) Surrey residents were in the employed labour force. Although efforts are being made to improve employment opportunities within Surrey, the majority of Surrey residents in the labour force, do not work in Surrey (see Appendix I). In 1991, 41% of Surrey residents worked in Surrey, whereas 72% of Vancouver residents worked in Vancouver.

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MAP 1
Lower Mainland of British Columbia
6.0. Municipal Land Use Regulations Pertaining to Telecommuting

The municipal system in Canada is based almost entirely on British law and practice. There are two orders of government established in the Constitution of Canada: federal and provincial. Municipalities are created by the provinces and can only perform functions which have been specifically authorized by provincial statutes. Provinces can only delegate functions to the municipalities which are within provincial jurisdiction.

Although the exact functional responsibilities of municipalities vary widely across Canada, most Canadian municipalities have been assigned the following functions:

1. fire protection;
2. construction and maintenance of local roads and services;
3. taxation of land and buildings; and
4. regulation of local land use.  

The common theme in the list of municipal responsibilities is the regulation of property. The regulation of local land use affects where, and if, telecommuting can occur.

In British Columbia, the Municipal Act R.S.B.C. is the major piece of legislation conferring the power to municipal governments to regulate planning and development. However, there are numerous other pieces of provincial legislation which affect the nature and process of land development. Some key examples in British Columbia include:

- Land Title Act;
- Agricultural Land Commission Act;

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The Municipal Act R.S.B.C. describes how municipalities are created and delegates certain powers to the municipalities. Part 29 of the Municipal Act specifies the municipal planning and development control parameters, including the application, contents and adoption of community plans (Section 944) and the scope of zoning by-laws (Section 963). In licensing of businesses is delegated to municipalities in Part 11 of the Municipal Act (Section 498).

In order to recognize the trend of people being more concerned about their quality of life and wanting alternatives to the regular long distance commute to work, the City of Surrey should update its policies and by-laws to permit greater work flexibility opportunities for its residents. With this goal in mind, the decision to not regulate home-based telecommuters should continue, however, explicit statements as to the use being permitted should be made. In addition, the City of Surrey should be encouraging the establishment of telework centres within its boundaries.

6.1. Official Community Plans

An Official Community Plan (OCP) is a statement of objectives and policies, focusing on the physical infrastructure and land use within the municipality. The OCP outlines the municipality's broad land use principles and subsequent by-laws and policies adopted must be in conformity to these principles.

The City of Surrey's Official Community Plan (OCP) was adopted in March 1985. It is a statement of objectives, policies and specific proposals regarding land use and community

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85 Ibid., 130-140.
development. The OCP, through a series of policy statements and maps, sets out Surrey's broad objectives with respect to the future pattern and form of land use and development.

The OCP for Surrey also establishes and applies a generalized form of land use districts, called "Designations" to the entire City. There are nine Designations in total: Downtown, Town Centre, Commercial, Multiple Residential, Urban, Suburban, Industrial, Agricultural and Special Study Area. A tenth Designation, Ecological, is proposed but has not received final by-law adoption.

The OCP Designations indicate which zones from the Zoning By-law are permitted within each area. Therefore, all developments must conform to the objective and policy statements in the Official Community Plan and the Official Community Plan Designations. Chapter II, The Policy Plan, of Surrey's Official Community Plan contains eight sections and they are as follows:

A. General Development Policies
B. Residential Policies
C. Environmental Policies
D. Parks Policies
E. Circulation Policies
F. Health & Safety Policies
G. Social Policies
H. Economic Policies

Within each section are objectives and policies which are intended to guide development in Surrey over the next ten years. Seeking employment policies related to telecommuting, only two examples were found. The first office employment-based policy in Surrey's OCP is contained under Objective 1: Nodal Development of Section A: General Development Policies. This policy (Policy 5: Offices in Town Centres) states "that office developments be encouraged to locate in

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87 Ibid., 125-127.
the town centres and that suburban office parks as well as office developments in industrial areas, be discouraged.\textsuperscript{88} This policy is intended to concentrate offices in the town centres and discourage dispersal of office space throughout the City. The interpretation of this policy with regards to telecommuting and particularly telework centres may actually result in discouraging telecommuting.

The second policy which has implications on telecommuting is contained under Objective 16: Social Stability of Section G: Social Policies. This policy (Policy 55: Stability of Neighbourhoods) states "that social stability be enhanced by the physical stability of a neighbourhood and that plans, zoning, and design guidelines contribute to a coordinated, cohesive community."\textsuperscript{89} It is conceivable that telecommuting can create a different type of stability than was originally intended.

With the goal of encouraging businesses to establish telework centres in Surrey, four recommendations pertaining to Surrey's Official Community Plan (OCP) are proposed. At present, Surrey's OCP is restrictive in terms of office uses, however, the City's Zoning By-law is more permissive. Before telework centres can be encouraged to locate in Surrey, the OCP must be revised.

Referring to the objectives contained in Chapter II of Surrey's OCP, there is no reference to employment. Therefore, it is recommended that a new Objective 22: Employment Growth be incorporated under Section H Economic Policies. Objective 22 should promote all types of employment and not be limited to only industrial employment (which is referred to in Objective 21 Industrial Growth). It is recommended that the following objective and policies be incorporated in Surrey's OCP:

\textsuperscript{88}Ibid., 139.
\textsuperscript{89}Ibid., 223.
Objective 22: EMPLOYMENT GROWTH
To ensure a continued growth in employment opportunities within the City of Surrey.

Policy 76: Balanced Employment
That optimum employment growth be encouraged so as to meet the job needs for local employment of the Surrey workforce; and that employment growth be distributed among as many communities in Surrey as is reasonable.

Policy 77: Work Options
That a variety of work options such as telecommuting (from neighbourhood, satellite, and home-based offices), flex time and job sharing be encouraged.

As noted earlier, the existing Policy 5: Offices in Town Centres can be interpreted as being contrary to the goal of promoting telework centres in Surrey. Therefore, it is recommended that the existing Policy 5 be deleted and replaced with the following:

Policy 5: Offices in Town Centres and Neighbourhood Centres
That office developments be encouraged to locate in the town centres and industrial office parks and that small office developments be encouraged to locate within neighbourhoods where neighbourhood commercial establishments are permitted.

6.2. Zoning By-laws

Zoning has its origins in concerns about public health and protection of private property. The traditional role of zoning has been to protect properties from the adverse impacts of incompatible uses. It typically establishes setbacks, height restrictions, density and bulk limitations so there will be no overcrowding, and people will have adequate sunlight, fresh air, and fire protection. Zoning is also seen as a means of providing stability and certainty with respect to the future, and thereby protecting land values.

Early zoning by-laws (referred to as ordinances in the United States) were concerned with minimum standards. Modern zoning by-laws and techniques have been designed to achieve a broader range of quality of life objectives. However, the basic purpose of zoning remains the
same: to protect private investment and public interest.

Telecommuting from home is generally viewed as an activity with no impact on the neighbourhood and there are typically no policies or by-laws to restrict this use.\textsuperscript{90} To clarify that home-based telecommuting is permitted from any residential zone, the Surrey Zoning By-law should be amended to so state. Therefore, in order to improve clarity, it is recommended that Part 1 Definitions and Part 4 General Provisions of the Surrey Zoning By-law be amended by including the following:

\textbf{Part 1 Definitions:}

\textbf{Home-Based Business:} means an accessory use of a portion of a dwelling unit, used for economic gain by the resident, which is wholly enclosed within a building and does not generate any noise, smell or glare beyond the dwelling unit.

\textbf{Neighbourhood Office:} means a \textit{telework centre} located in a neighbourhood, where the \textit{telecommuting} workers are employees from different organizations.

\textbf{Satellite Office:} means a \textit{telework centre} located in a community by one organization, which is intended to provide workspace for their \textit{telecommuting} employees.

\textbf{Shared Office Facility:} means a place where two or more unrelated businesses are located together and typically share reception and administrative services and conference rooms.

\textbf{Telecommuting:} means an employee performing all or a portion of his or her regular work activities from a remote location, on a full-time or part-time basis.

\textbf{Telecommuting - Home-Based:} means \textit{telecommuting} from the home or a specified area in a multiple residential development, but excludes \textit{home-based businesses}.

\textbf{Telework Centre:} means a place which is located remotely from the head office where \textit{telecommuting} is carried out, and excludes \textit{shared office facilities}.

\textbf{Part 4 General Provisions:}

\textbf{Uses Permitted in Specific Zones:}

\textbf{Home-Based Telecommuting:}

6. \textit{Home-based telecommuting} is permitted in all single-family and multiple-family residential zones.

\textsuperscript{90}This is contrary to home-based businesses in which there are usually strict regulations.
The Zoning By-law does regulate the development of telework centres. In September 1993, Surrey Council adopted a new Zoning By-law (No. 12000). In terms of telework centres, there were two significant changes from the old to the new by-law. The first significant change was the addition of the C-5 Neighbourhood Commercial Zone. This zone is intended to accommodate and regulate the development of neighbourhood scale shopping nodes.\textsuperscript{91} Specific uses are permitted with each use being limited to a gross floor area of 4,000 square feet (372 square metres) per individual business. Office uses (including telework centres) are specifically permitted.

In terms of office uses, the second significant change between the old Zoning By-law and the new one concerns industrial business parks. In conformity with Policy 5 of the OCP, the old Business Park Zone was very restrictive in terms of office uses. When the new Zoning By-law was drafted, there was recognition that Surrey was not developing business parks (i.e. for high tech businesses) as successfully as other Lower Mainland jurisdictions (i.e. Richmond). Therefore, the new IB Business Park Zone permits office uses without any restrictions.

Throughout the Zoning By-law where office uses are permitted, convenience uses (such as restaurants and banks) are also permitted. The intent is to develop areas where a range of compatible uses can be developed and, thereby, provide convenience for the workers. Telework centres are specifically permitted in the following zones:

- C-5 Neighbourhood Commercial Zone
- C-8 Community Commercial Zone
- C-8A Community Commercial A Zone
- C-15 Town Centre Commercial Zone
- C-35 Downtown Commercial Zone
- RMC-135 Multiple Residential Commercial 135 Zone
- RMC-150 Multiple Residential Commercial 150 Zone

\textsuperscript{91}City of Surrey, \textit{Surrey Zoning By-law, 1993, No. 12000}, 35.1
6.3. Business Licensing

It is customary for municipalities to require all businesses operating within their jurisdiction to obtain a business license. The business license system allows the municipality to ensure that proposed uses conform to the zoning and that parking requirements and signage restrictions are satisfied. Fees are established for every business and are usually based on the extent of the business (i.e. floor area of the business premises or number of employees). Penalties can be imposed for violating any part of the license.

Surrey's Business License By-law (No. 4747) is concerned with the granting of licenses and the regulation of businesses. This by-law specifies that businesses are required to hold a valid license in order to operate and that the license must be renewed annually. The fees are specified in a schedule attached to the by-law.

In Surrey, because telecommuting from home is seen as incidental to the primary residential use, business licenses are not required to telecommute from home. Business licenses are required, however, for businesses with employees telecommuting from telework centres (neighbourhood and satellite offices).

For the purpose of operating a telework centre in Surrey, the annual business license fee varies depending on the specific use. Rather than only the operator of the centre required to hold a valid business license, each business represented in the telework centre is required to obtain a

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92 Ibid., 26.1-27.6 and 35.1 to 47.6.
93 Again, telecommuting is viewed differently than home-based businesses. For home-based businesses, business licenses are required.
94 City of Surrey, "Business License By-law, 1976, No. 4747."
business license. For consulting or technical services, such as bookkeeping, accounting and income tax services, the fee is $103 plus $14 for each employee. For professional practitioners (including doctors, lawyers, professional engineers and architects) the annual fee is $221 plus $14 for each employee. For real estate and insurance agents, the annual fee is $221 plus $28 for each employee.

This method of fee calculation is an obvious deterrent to prospective organizations considering implementing telecommuting from various telework centres. With other Lower Mainland municipalities basing their fees similarly, organizations will not likely have employees telecommuting from several municipalities. If the analogy of a hotel which rents rooms to its guest was used to determine the rental of office space in telework centres, the business license would be based on the number of rooms (or office spaces); the operator of the centre (not the individual office space users) would be the only business required to obtain a license.

In addition to the method of fee calculation, the method of calculating required parking should be reviewed. At present, the Surrey Zoning By-law bases the parking requirements for office uses on the number of employees. Because it is likely that more than one worker will share a work space, the required parking will likely be excessive. For neighbourhood offices and some satellite offices, the worker may live close enough to not need a car to travel to work. It is recommended that the required parking be based on a portion of the total number of work spaces (i.e. 60%) and not on the total number of workers using the centre.
7.0. Telecommuting and Land Development Application Review Procedures

A major activity municipalities perform is reviewing applications to develop or redevelop lands. This review may involve determining the most appropriate land use, or how that land use can best be accommodated through proper siting of buildings or amenities to be provided. An implicit goal of planners and urban designers has been to build a community infrastructure that supports social interaction. A mixture of compatible land uses is a common approach to reach this goal.

As explained in section 6.2, telecommuting from home is generally not restricted in most municipalities. Restrictions may be imposed, however, due to homes not being of sufficient size to accommodate home-based telecommuting. Bachelor or one-bedroom apartments, for example, may be too restrictive in terms of adequate work and storage space.

Anticipating residents' needs may mean that one of the amenity features of a multiple residential development is a library or shared office space with sufficient wiring to accommodate several workers at one time. These workers would be residents of the complex and rent for the workspace could be incorporated in the regular monthly maintenance fees.

Whether or not a special room for telecommuting is provided in residential condominiums, efforts should be made to ensure that strata corporations do not try to prohibit home-based telecommuting. Education is likely part of the answer, however, legal means such as restrictive covenants may be the only means to ensure the use is permitted.

In British Columbia, restrictive covenants are legal instruments specified in section 215 of the Land Title Act, R.S.B.C. They are used to restrict the use of the land or the use of buildings on
The covenant is registered on the title of the land and the municipality would be a party to that covenant. Thus, the restrictive covenant could stipulate a strata council must allow telecommuting and retain the shared office space if it is located in the common space of the residential complex.

7.1. Locational Criteria for Telework Centres

As was stated earlier, zoning usually does restrict where telework centres can be located. To assist in accommodating the development of telework centres, perhaps locational criteria should be developed. It has been suggested that the telework centre "could be linked with the elementary school as an organizing principle for neighbourhood planning." Expanding upon this idea, the following are some suggested locational criteria for telework centres in newly developing areas and areas that are redeveloping.

*Telework centres should be...*

- centrally located in a populated area;
- within a walking distance of 400 metres (one-half mile) to certain commercial uses (i.e. coffee shop, restaurant, convenience store, deli, bank);
- in close proximity to child care services;
- near public facilities such as park, swimming pool or library; and
- well serviced by public transit.

*Telework centres could be...*

- within commercial strips and shopping centres;
- within industrial business parks; and
- within buildings of heritage or cultural significance.

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96 Penelope C. Gurstein, "Working at Home in the Live-In Office: Computers, Space, and The Social Life of Households" (Ph.D. diss., University of California, 1990), 183.
To minimize the need to commute long distances, telework centres should be located in close proximity to a relatively densely populated areas. Multiple-family residential areas are prime areas for telework centres due to the higher concentration of possible telecommuters.

Telework centres should not be isolated. Services, such as coffee shops, restaurants and banks should be located within a walking distance of 400 metres (one-half mile). These facilities provide convenience for the telecommuters and the opportunity for social interaction.

In addition to commercial services, amenities and services like child care centres, parks, swimming pools and libraries should be nearby. These facilities provide the opportunity for social interaction in addition to providing convenience, enjoyment, and sensory relief for the telecommuters. "The social and recreational amenities should recognize the presence of [telecommuters] in the neighbourhood, and orient amenities and activities to encourage their participation."97

With one of the advantages of telecommuting being that traffic congestion could be reduced, telework centres should be nearby a regularly-serviced public transit stop. Ideally, the telecommuter will walk or cycle to work, but if convenient enough, public transit may be preferred over the private automobile.

Sites which likely meet the above criteria would include main shopping streets (i.e. commercial strips) and shopping centres. These uses are generally located near higher density residential areas, include food stores and services and are well serviced by public transit.

Industrial business parks are also suitable for telework centres. Although the commercial conveniences will be fewer than along a main shopping street, sufficient services are usually

97Ibid., 184.
provided and the rents are generally lower than commercial areas.

Another consideration for a telework centre is a heritage building. Often there is a municipal policy to preserve historical buildings, but the economics may dictate otherwise: not all heritage buildings can be turned into museums. Although not all of the locational criteria noted above may be satisfied, encouraging the retrofitting of heritage buildings for the development of telework centres can serve two purposes:

1. save an historically significant building; and
2. provide a place of employment for residents within their community.

7.2. Development Guidelines for Telework Centres

Successful telework centres should be located according to the criteria noted in section 7.1. The characteristics of the telework centres themselves, should include:

- sufficient bicycle storage facilities;
- shower and change room facilities; and
- adequate access to natural lighting.

One objective of telework centres is to reduce the need for workers to commute great distances daily. By locating telework centres closer to where the telecommuters live, increases the likelihood of people walking or cycling to work. To encourage person-powered commuting, secure bicycle storage facilities should be provided.

Related to the above, the provision of adequate shower and change room facilities should be addressed. These facilities could be incorporated in the telework centre or, if possible, made
available at nearby recreational centres.

Consideration should be given to the provision of access to natural light for each of the designated workspaces within the telework centre. With security in mind, windows and skylights should be designed to provide natural lighting.
8.0. Telecommuting and Recreation & Library Program Planning

Recreational facilities and libraries are designed to provide the opportunity for social interaction in addition to providing enjoyment, exercise and education for the users. As stated in section 7.1, such facilities should recognize the presence of telecommuters in the neighbourhood and orient amenities and activities to encourage their participation.

The hours in which programs are offered should be adjusted to accommodate more adults that are remaining in the community during the day. Perhaps during the week, adult-only swimming could be offered at noon hours or "how-to" courses offered at 4:00 PM.

In addition to rescheduling of programs, the variety of programs offered may need to be expanded to encourage telecommuters to participate. Depending on the number of workers in the community, perhaps noon-hour lectures or educational sessions could be organized which deal with issues that are pertinent to remote workers. Examples include lectures on the latest technological innovations or hands-on demonstrations on how to access international electronic mail systems.

To determine the need to adjust programs and scheduling may require a survey of the community. The survey should attempt to determine the number of potential users throughout the day and evening and the types of activities sought. Based on the responses, appropriate adjustments can be made to the programming and the community should be so advised.

The goal should be to encourage more use of the recreational facilities and libraries at all hours of the day. With more adults remaining in the community to work, programs which meet their needs should be an important consideration.
9.0. Telecommuting and Municipal Infrastructure Planning

To ensure that maintenance and construction of roads and services (i.e. water and sewer) are accounted for in budget preparations, municipalities prepare servicing plans. These plans are generally ten-year plans and assume a certain level of population and employment growth. The growth projections are based on past trends and anticipated developments.

As described in section 3.1 Society's Perspective, one benefit of telecommuting can be the control of infrastructure costs for construction and maintenance. With more employees working closer to home (or within their homes), the demand on existing roads and public transit may decrease. However, at the same time, the demand on services closer to home (or within the home) may increase.

Hypothetically, if a telework centre with fifty work stations began operating in a community, there could be an impact of up to fifty fewer cars on the major roads commuting to the central office area. On the other hand, with fifty more people staying within the community during the day to work, the demand for services such as water may exceed that which was anticipated.

The traditional method of calculating demand on roads and services may need to be reviewed if telecommuting becomes a popular work option.

The degree to which telecommuting is adopted, the specific forms it takes, and the magnitude of the public benefits actually obtained depend largely on attitudes of people toward their work and workplace, the adaptability of corporate culture, the nature of the work performed, and the specifics of changes in their travel behavior. Not surprisingly, there is wide variation among predictions of the future of telecommuting and its impacts.\textsuperscript{98}

\textsuperscript{98}USA, Department of Transportation, "Transportation Implications of Telecommuting," vii.
10.0. Telecommuting and Municipal Marketing Plans

For several reasons, including to improve the municipal tax base, commercial and industrial operations are often sought by Business Development Departments (BDD) from within the municipal organization. In addressing this pursuit of economic development, there are at least two municipal approaches which can be identified. "The first is a 'top-down' model of community economic development that focuses on large, corporate employment."99 An example is the suburban BDD trying to entice head offices in the downtown to relocate within their municipal boundaries. For some municipalities, this goal may be too optimistic. The desire of the company executives may be to remain in the downtown where the private clubs, unique services, and other senior management people are located.100

The second approach to economic development is a "bottom-up model ... based on small and medium enterprise development ... and [this] has been referred to as the 'sustainable' community concept."101 Telework centres fit into this category and may be a more realistic goal for suburban communities. Rather than seeking a complete move of targeted head offices, perhaps a neighbourhood or satellite office is a better alternative. The telework centre could be located close to where a significant number of potential telecommuting employees live.

To assist in locating ideal sites for telework centres, employees' home postal codes can be utilized. The first three digits of the employees' home postal codes could be gathered and through the use of a Geographic Information Systems (GIS) computer program, mapped to show where the greatest concentrations of potential telecommuters reside. These concentration areas together with the locational guidelines (see section 7.1), could then be used to determine appropriate

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99 Barbara Orser and Mary Foster, "Home Enterprise: Canadians and Home-Based Work," 14.
100 Peter F. Drucker, Managing for the Future: The 1990s and Beyond, 128.
locations for telework centres.

Another marketing idea which some municipalities could consider are destination remote offices. Destination remote offices are offices and residences established in a resort setting. This new concept of "bringing the workplace closer to home in a rich natural environment" is currently being studied in Japan.\(^\text{102}\) The Regional Policy Division of Gunma Prefecture sees this new concept as leading the way in future workspace and lifestyles with the following goals:

1. to expand individual lifestyle options;
2. to assist corporations to improve their productivity (including creativity) and hiring ability; and
3. to revitalize local communities with new jobs, people, and technology.\(^\text{103}\)

To encourage organizations to implement telecommuting programs, municipalities may need to consider incentives. Savings in terms of tax breaks or waiving of business license fees could be considered for the first year of operation, with gradual increases for successive years. The municipality's justification of such revenue deferments would be that the roads and bridges are not under as much demand due to some of the municipality's residents telecommuting.

10.1. Telecommuting Communication Plan

Once the advantages of telecommuting are understood, municipalities should encourage this work option. In order for municipalities to succeed in encouraging businesses to implement telecommuting, employers and employees need to be aware of the concept; one such mode is a conference. Critical to the success of any policy initiative is a properly conceived communications

\(^{103}\)Ibid.
plan. Using the City of Surrey as the case municipality, the following communication plan is proposed.

10.1.1. Concept

The purpose of the communication plan is to bring about wider awareness of the benefits of telecommuting.

10.1.2. Target Audience

Telecommuting is the concept of employees performing some portion of their regular work activities from a remote location (typically one to three days per week). Therefore, businesses located in downtown Vancouver with many of their employees living south of the Fraser River should be targeted for the conference. Other audience targets should include City Councillors, members of the Chambers of Commerce and members of the Greater Vancouver Regional District.

10.1.3. Message

The theme should be "move work to the worker and not the worker to the work." Employers should learn of the benefits of telecommuting and that the City of Surrey has changed its policies and procedures to encourage this work option.

10.1.4. Mode

To bring about awareness of telecommuting, a conference should be sponsored by the City of Surrey. The venue should be local and private and public organizations should be invited. In
addition to the conference, posters describing the benefits of telecommuting should be posted at transit stops and on buses.

The conference should be intended to inform and bring about change. Experts on implementing telecommuting programs, corporate telecommuting champions and telecommuters themselves should be keynote speakers. Facts on the business and societal benefits of telecommuting (i.e. improved worker productivity, improved quality of work, less road congestion) must be demonstrated. Information packages should be prepared and distributed to each participant. These packages should contain background information and a map indicating possible sites for telework centres in Surrey.

10.1.5. Follow-Up

Once the conference has concluded, follow-up by the Business Development Department will be critical. Assistance will be required in finding or rezoning suitable telework centre sites. Where rezoning is required, commitments to "fast-track" applications should be given by the City and carried out by its employees. To ensure that such applications are dealt with expeditiously, staff must be educated as to the benefits of telecommuting and the importance of their cooperation.
11.0. Municipal Employee Telecommuting Program

To illustrate the municipality's support of telecommuting, a pilot telecommuting program could be offered to suitable municipal employees. This effort would not only demonstrate the municipality's commitment to telecommuting but should also result in, among other things, improved worker productivity and higher employee morale.

For large municipalities, such as the City of Surrey, telework centres could be established in different areas of the municipality for its employees. To satisfy the proposed locational criteria and save costs, municipal satellite offices could possibly be combined with existing recreational facilities, libraries, or even fire halls. Alternatively, office facilities shared with other levels of government or other organizations (i.e. neighbourhood offices) could be considered. As in any case with shared offices, confidentiality will play a factor but in most cases should not prohibit the work option.

In addition to the telework centres, telecommuting from home should be available for qualified employees who do not live near telework centres. Minimal costs are involved in this workplace option and, therefore, home-based telecommuting may be more desirable from a cost savings point of view.

The key to successful telecommuting would be to identify the tasks which can be done remotely and then the ability of the employees to be effective when working remotely. As stated in section 4.1 Suitable Jobs or Tasks, the four key characteristics of tasks that are appropriate for telecommuting are as follows:

1. Task has minimal physical requirements of other labour and capital inputs;
2. Task outputs can be defined and measured unambiguously without on-site supervision;
3. Task requires concentration; and
4. Task requires little unscheduled face-to-face contact.

Even though the majority of staff in most municipal governments are unionized, it does not mean that telecommuting can only be offered to non-unionized employees. The BC Systems Corporation pilot telecommuting project in Victoria, B.C. demonstrated that telecommuting can be implemented with both unionized and non-unionized workers. However, to ensure success, it is critical to have the union involved at the beginning.
12.0. Areas for Further Study

This paper has described what telecommuting is, why it is becoming a popular work option, how municipalities can benefit from this trend and in turn how municipalities can assist in its implementation. What has not been examined is how other levels of government should become involved.

In the United States, the federal government has encouraged telecommuting as it may assist in satisfying the legislative mandate to improve air quality. The Clean Air Amendment Act (CAAA) is focused on achieving higher levels of air quality, particularly in the more heavily polluted urban regions and is a major motivation for public sector interest in telecommuting in many areas.

As a result of the CAAA, state governments in the United States have assisted local governments in implementing telecommuting through various ways such as pilot projects, conferences, and grants. In most cases, the goals of these pilots have been to eliminate lengthy commutes, reduce fuel consumption and improve air quality.

In Canada, the federal government implemented a three-year telecommuting pilot for home-based telecommuters in August 1992. The purpose of the program is to allow federal government employees to better balance their work and personal lives. There are presently no incentives in place to expand beyond federal employees.

The provincial governments of British Columbia and Ontario have also implemented telecommuting for their employees. In B.C., telecommuting was initiated to support the principle of environmental responsibility. In Ontario, the program was initiated to retain valuable employees. To date, there are no programs in place to encourage non-government organizations to telecommute.
What remains to be studied is whether the enactment of specific legislation has actually encouraged at a faster rate, the implementation of telecommuting (i.e. United States). Is telecommuting, as a work option, just as popular where no such legislation is in place (i.e. Canada)?

As illustrated in Appendix I, in British Columbia's Lower Mainland there are over 800,000 people employed in the labour force and residing in eighteen different jurisdictions. There has been a "virtual doubling of the metropolitan population to 1.8 million over the past three decades, and current projections suggesting a population of three million by 2021."¹⁰⁴ Telecommuting could well capture a good proportion of this increment.

This paper has addressed how one Lower Mainland municipality (the City of Surrey) can address telecommuting in its own regulations and procedures. However, to obtain regional benefits from telecommuting in the form of reduced transportation infrastructure costs, increased highway safety, improved air quality, increased energy conservation, and a greater sense of community, the approach taken by each jurisdiction should not be contradictory.

There should be a common understanding among all municipalities in a region of the concept of telecommuting, a common definition and a common approach. What should be further studied are methods which can be used to coordinate jurisdictions, such as the eighteen in the Lower Mainland of British Columbia, to encourage telecommuting in the region.

Another area which requires further study is the issue of home-based businesses. Like home-based telecommuting, running a business from home is a growing trend. Here too, municipalities should recognize this trend and review their regulations and procedures to ensure their

appropriateness today. Again, a regional, metropolitan, or at least an inter-municipal economic strategy is more appropriate than a strictly independent municipal strategy.
13.0. Conclusion

Telecommuting deserves serious attention on the part of municipalities because it can deliver large benefits in economic, environmental, and social terms. Provided that the telecommuting program is properly planned and suitable telecommuters are selected, telecommuting has proven to be a beneficial work option. Among other things: the employee can benefit through greater empowerment in the workplace, reduced commuting, and improved quality of life; the employer can benefit through improved quality and quantity of output; and society can benefit through less highway congestion, reduced energy consumption and a greater sense of community.

With the increasing incidence of telecommuting, municipalities must become more aware of the advantages that accrue to the municipality and the resulting impacts on the operation of the municipality. Six benefits accrued to municipalities have been identified: transportation infrastructure cost savings; community development; decreased breaking and entering crimes; emergency preparedness planning; tax base improvements; and assisting in the information highway leadership role. To achieve these benefits, however, municipalities must take a proactive role in the evolution of telecommuting.

To pro-actively support, encourage and evolve telecommuting within the community, there are at least six areas which municipalities need to analyze and possibly implement changes. These areas include the following:

1. Land use regulations;
2. Land development application review procedures;
3. Recreation and library program planning;
4. Municipal infrastructure planning;
5. Municipal marketing plans; and

6. Municipal employee telecommuting program.

Each of these areas have been reviewed in detail and specific recommendations have been made for the municipality used as a case study -- City of Surrey, British Columbia. For land use regulations, the Official Community Plan, Zoning By-law and Business License By-law have been reviewed and suggestions have been given which would reinforce Surrey's intent of improving employment within the City boundaries.

Following the amendments to the relevant by-laws, a review of the land development application procedure is recommended. To clarify the City's position on telecommuting, locational criteria for telework centres and building guidelines for telework centres have been suggested.

With the goal of having more people working from within their neighbourhoods, recreation and library program planning should be reviewed and adjusted accordingly. The times during which specific programs are offered should reflect the needs of the community and these needs may be changing with telecommuting becoming more common.

To more accurately project the maintenance and construction of roads and services, municipalities should consider telecommuting as one factor. Traditional methods of forecasting may overestimate certain requirements and under-estimate other requirements.

Municipal marketing plans must recognize the growing trend in telecommuting. For suburban communities, marketing for head offices to relocate may be inappropriate, whereas marketing the head office for telework centres may be more successful. To bring about a wider awareness of telecommuting, a telecommuting communication plan is proposed. One suggested mode is a City-sponsored conference for an audience representing a wide spectrum of interests.
A final suggestion is the implementation of a telecommuting pilot program for municipal employees. Depending on the size of the municipality, home-based telecommuting and telecommuting from telework centres could be implemented. To save costs and to conform to the suggested locational guidelines, telework centres could be established in existing recreational facilities or perhaps within other government buildings. With most municipal governments being unionized, it is critical to involve the union at the beginning to ensure success.

In conclusion, telecommuting is a work option that is increasingly common. Although not every job may be suitable for telecommuting, certain tasks may be compatible. Telecommuting is not intended to limit face-to-face interaction, but rather to reduce the amount of commuting and improve productivity when being face-to-face is not necessary. Municipalities can play an important role in encouraging this work option.
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