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BROWNFIELD REDEVELOPMENT IN LONDON, ONTARIO: DEVELOPING A METHODOLOGY FOR A BROWNFIELD DATABASE AND AN EXAMINATION OF POLICY INITIATIVES AIMED AT PROMOTING REDEVELOPMENT

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Abstract

Brownfield redevelopment, because of its contributions to urban sustainability and environmental quality, has become a critical issue on cities' policy agendas and in urban development literature of late. There have been no studies examining the issue of brownfield redevelopment in London, Ontario, Canada nor have there been any studies that detail a method to create a city-wide inventory of brownfield sites. This research has three main objectives: to develop a GIS based methodology for creating a brownfield inventory; through interview analysis, indentify the barriers to successful brownfield redevelopment in London; and to determine whether or not the financial incentives in the London Brownfield CIP are effective mechanisms in promoting brownfield redevelopment. The major barriers to brownfield redevelopment in London are the public's perception, high cost of redevelopment, liability, competition from greenfield sites, lack of demand and the complicated process of remediation. The effectiveness of financial incentives are based on local market conditions, that is, only when there is a demand for brownfield redevelopment will the incentives be utilized; the incentives do not create demand.

Keywords: Brownfield, redevelopment, remediation, urban development, sustainability, smart growth, policy, financial incentives, GIS, interviews.

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List of Abbreviations

CBD: Central Business District

CBN: Canadian Brownfield Network

CIP: Community Improvement Plan

CMA: Census Metropolitan Area

CSHE: Chicago School of Human Ecology

ECA: Environmental Cleanup Agency

EDO: Economic Development Organization

ESA: Environmental Site Assessment

FIP: Fire Insurance Plan

GIS: Geographic Information System

GMF: Green Municipal Fund

HEAL: Human Environment Analysis Laboratory

MPC: Member of Planning Committee

NIMBY: Not In My Backyard

NPIG: Non-Profit Interest Group

NRTEE: National Round Table on the Environment and Economy

PD: Private Developer

PO: Property Owner

RSA: Record of Site Condition

SCP: Senior City Planner

US EPA: United States Environmental Protection Agency

Chapter 1: Introduction

1.1 Introduction

The deindustrialization process that followed global economic restructuring has reshaped the modern urban landscape in many ways. One important outcome of this process is the emergence of countless underutilized or abandoned industrial and commercial properties, commonly referred to as brownfield sites. Over recent years, various levels of governments in North America and Europe have placed a strong emphasis on the regeneration of these sites as a way of promoting sustainable urban development.

Although governmental support of brownfield redevelopment is strong, a host of obstacles have prevented the successful redevelopment of these sites, most notably liability concerns, financial costs, planning approvals and lack of information on the true environmental condition of a site. However, the redevelopment of brownfields has the potential to generate a multitude of public and environmental benefits such as an increase in the tax base, reduction of sprawl, urban renewal and environmental cleanup. Brownfield sites are often located in the core of urban areas and their underutilized condition presents a considerable obstacle to urban renewal and development. At the crux of the issue of brownfield redevelopment is that their low market value and central location make them attractive targets for redevelopment (De Sousa, 2003).

A wide range of federal and provincial legislation exists to promote brownfield development in Canada. In 2000, the federal government established the Green Municipal Enabling Fund which provides grants of up to $100,000 for community brownfield feasibility

assessments of development; however it does not cover brownfield cleanup costs. Ontario's *Brownfields Statute Law Amendment Act 2001,* seeks to encourage brownfield redevelopment by clarifying environmental regulations and liability as well as providing municipalities with more flexibility in planning and financing. Even with these initiatives in place, the bulk of the financial investment in brownfield redevelopment is solely the responsibility of the owner or developer of the property, with governments playing primarily a regulatory role (De Sousa, 2000). Consequently, the cost of remediation and the stigma associated with brownfields has deterred the private sector from spearheading redevelopment campaigns.

1.2 The Definition of a Brownfield

There are many definitions of the term brownfield, ranging from the very vague to the extremely detailed. Examples of the former include basic descriptions such as "the opposite of greenfield" (Alker et al., 2000, p.52), any land that has been previously developed land (DETR, 1999), or "land that requires some form of cleanup" (Alker et al., 2000, p. 53). Some of the more complex definitions are taken from governmental agencies. For example, the US EPA defines brownfields as "abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination. Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant" (US EPA, 2008). Another example can be drawn from the Department of the Environment in England, where a brownfield is defined by a certain parcel of land's characteristics which include: "Any land that has been previously developed; previously developed land which is now vacant; vacant buildings (excluding single residential dwellings); derelict land or

buildings; other land or buildings allocated for any development; and other previously developed land or buildings where it is known there is a potential for redevelopment" (DETR, 1999, p.2). The relevance of this definition is that potential or real contamination is not a defining characteristic of a brownfield site.

In Canada, there is no formal definition of the term brownfield and each level of government tends to construct its own definition. For example, the National Round Table on the Environment and Economy defines it as "abandoned, vacant, derelict or underutilized commercial and industrial properties where past actions have resulted in actual or perceived contamination" (NRTEE, 2003, p.1). In Ontario, brownfields are defined as "lands that are potentially contaminated due to historical, industrial or commercial land use practices, and are underutilized, derelict or vacant" (Ministry of Municipal Affairs and Housing, 2007, p. 6). The City of London, Ontario defines the term as "abandoned, vacant or underutilized lands and/or buildings within the City of London where expansion, retrofit or redevelopment is complicated by environmental contamination from past uses and development activity" (City of London, 2006, p. 31). With these various definitions in mind, a number of commonalities among them can be drawn; the land must have been previously developed, the land must currently be vacant or underutilized, and redevelopment is complicated by the presence of real or potential contamination. However, the City of London considers only land that has been proven to be contaminated as brownfield land. This fact distinguishes London's definition since other definitions incorporate the assumption that even if the land is potentially contaminated, it may be considered brownfield land.

Similar to the policy arena, there are a plethora of definitions in the academic literature as well. Gute & Taylor (2006) contend that brownfields have been defined in a

formal sense in many ways. Essentially, brownfields comprise parcels of formerly developed land, mainly in urban settings which contain real or potential contamination. Alker et al. (2000) conducted an international study of brownfield definitions and in their study they call for a more vigorous definition. According to them, a brownfield site "is any land or premises which has previously been used or developed and is not currently fully in use, although it may be partially occupied or utilized. It may also be vacant, derelict or contaminated. Therefore a brownfield site is not available for immediate use without intervention" (Alker et al., 2000, p. 64).

Herbele & Wernstedt (2006) conducted six separate studies that surveyed a large number of brownfields throughout the US. They found that brownfield properties typically lie in economically disadvantaged neighbourhoods of older urban areas, but they also appear in suburban and rural locations. Former manufacturing and other industrial facilities constitute the majority of brownfield sites, although are not the exclusive prior use. For example, a gas station, which is neither industrial nor a manufacturing site, may result in contamination due to underground storage tanks. Other previous uses include public, military and commercial facilities (Herbele & Wernstedt, 2006).

The notion of a brownfield brings to mind the image of massive derelict industrial facilities littered with industrial residue, of decaying and polluted structures that represent an urban blight. The literature does not suggest that there are defined universal assumptions about size or scale of brownfields. It is generally recognized that most are large industrial complexes, yet little is known about the smaller sites such as gas stations or machine shops, nor is much known about the distribution of these sites (Page & Berger, 2006). That being said, Alker et al. (2000, p. 64) contend that the characteristics of a brownfield are as follows:

- Brownfield land is land that has previously been developed;
- All land which is not in current use, and which presents actual or suspected land contamination;
- Land which is wholly currently developed and used is not brownfield, even if contaminated;
- Brownfield land exists in rural and urban locations;
- Brownfield land may exist within a Green Belt some brownfield sites, or parts of such sites, may also be (but are not necessarily) contaminated land;
- Some brownfield land, or parts of such sites, are also classifiable as derelict land;
- And some brownfield land, or parts of such sites, are also classifiable as vacant land.

It is clear from the literature that the term brownfield can mean many things. Its definition is open to interpretation. However, taking into consideration the various definitions of the term, I consider a brownfield to mean: land that has been previously developed; land that may or may not have an existing structure built upon it; land that is currently vacant, abandoned or underutilized; any previous use of the land, at any point in time, that may have resulted in real or perceived contamination today; and land, the redevelopment of which is complicated by potential or real contamination.

1.3 Research Objectives

This research has three main objectives:

1. In London, a brownfield incentive package was created without ever knowing the true extent of the issue. Further, there have been no studies detailing a universally applicable method to create an inventory. Therefore, a main objective of this thesis is to develop a methodology for creating a brownfield inventory

2. The literature has shown that brownfield redevelopment faces a number of barriers. In light of this, another major objective of this thesis is to identify the barriers to successful brownfield redevelopment in London

3. To date, no studies have sought to gauge the extent to which policy objectives are being translated into reality in a typical mid-sized Canadian city. So, the final objective if this thesis is to determine whether or not the financial incentives in the London Brownfield CIP are effective mechanisms in promoting brownfield redevelopment.

1.4 Community Profile

This research employs a case study approach and takes place in London, Ontario, Canada. In order to increase the understanding of the issues surrounding brownfield redevelopment in London, an intense study involving an in-depth analysis of the London context in terms of brownfield redevelopment was required. This research took place within the London's census metropolitan area (CMA). London was selected as the study area mainly because the City can be considered as representing the typical midsized Canadian city. Furthermore, no in-depth study focusing on a Canadian midsized city's experience with brownfield incentives has been conducted. London, approximately the tenth largest Canadian city with a population of 457,720 (see Table 1.1) (Statistics Canada, 2006), is located in Southwestern Ontario and may be considered representative of an average midsized Canadian city in terms of population size, composition and economic indicators.

Table 1.1 Selected Population Characteristics of the London CMA, Ontario, and Canada (2006).

	London	Ontario	Canada
Population in 2006	457,720	12,160,282	31,612,897
Population Change %: 2001-2006	5.1	6.6	5.4
Median Age	38.6	39	39.5
Median Earnings Persons Aged 15 yrs and Over who Worked fully, full time	42,746	44,748	41,401
Total population with a university Bachelor's degree or higher	68,046	2,012,060	3,985,745
Unemployment Rate	6.1	6.2	6.6

Source: Statistics Canada, 2006.

1.5 Organization of Thesis

This thesis consists of 5 additional chapters. Chapter 2 presents an explanation on the rise of brownfields and situates brownfield redevelopment into the broader contexts of sustainability and smart growth. Chapter 3 makes an argument in support for the need of cities to create brownfield inventories to better manage their brownfield problem and also presents a methodology to do so. Chapter 4 offers a review of brownfield regulation in Ontario and a summary of brownfield policies in London, Ontario. Chapter 5 details the methods utilized in the interview component of this thesis and also presents the results of the interviews. Chapter 6 presents a discussion of the findings and explores the findings in relation to the theoretical underpinnings of the study. This chapter also discusses the results of this study and their implications for brownfield policy in London. I conclude with a discussion on the limitations of this study as well as suggestions for future research.

Chapter 2: Theoretical Underpinnings

2.1 Introduction

This chapter aims to establish the theoretical context of the research and is divided up into two sections. The first section will explain the emergence of brownfields within the context of urban land use change. The second section will situate brownfields under the rubrics of smart growth and sustainability. It will also show that brownfield redevelopment represents an application of the principles of sustainable development and smart growth.

2.2 Theories of Land Use Change to Explain the Prevalence of Brownfields

Brownfields can be understood to be products of urban land-use change; thus a brief examination of some of the main theories of urban growth and change can help situate some of the issues associated with brownfield redevelopment as well as explain the rise of brownfields in today's post-industrial cities. Starting with the Chicago School of Human Ecology (CSHE) and the monocentric city, the next section explains how brownfields came to be under the model of invasion and succession. Following this, brownfields are conceptualized using Alonso's (1960) bid-rent theory. Next is a discussion framing brownfields in the context of ethnic segregation. Subsequently, I delve into an examination of brownfields in terms of residents' rent-paying ability and locational choice. What follows is an account of the rise of brownfields under the conceptualization of shifts in global production systems. I then move on to discuss brownfields in terms of the edge city and urban realms models. Finally, this section

concludes with what we might expect in terms of the future trajectory of brownfields within the context of urban land-use change.

One of the earliest and most prominent theories of land use change was developed by the Chicago School of Human Ecology in the early 1920s (Park et al., 1925). The Chicago School conceptualized the city from the human ecological point of view. This means the city was envisioned as a product of spatial and temporal relations of human beings as affected by the forces of the social and physical environment (Park et al., 1925). The model viewed the city as monocentric in form, characterized by an urban core or central business district (CBD), with the CBD having the maximum employment density, maximum number of trips, and maximum rent. Land uses are segregated into concentric zones around the CBD, and each zone represented a different land use and population groups; economic status of residents increased with distance from the CBD. Moreover, the more distant from the CBD a zone was the less dense the built environment, house size also increased with distance from the centre.

In this model, cities expanded by a process of invasion and succession. As new immigrants moved into the city they located in the older areas of the city closer to the urban core. This forced those already living there to retreat to newer and distant areas of the city. And with each succession came a new zone outlying it. Within the CBD is to be found the main area of homelessness. In the surrounding zone of deterioration are the slums, usually filled with new immigrants to the city. Surrounding this zone is an area dominated by immigrant factory and shop workers. This process of invasion and succession is always accompanied by gains in population, and the significance of this increase is primarily of an immigrant nature (Park et al., 1925). This process is compared to that of a wave where the "influx of new immigrants has the effect of a tidal wave

inundating first the immigrant colonies from the ports of entry first, dislodging thousands of inhabitants who overflow into the next zone and so on until the momentum of the wave has spent its force" (Park et al., 1925, p.58). Some scholars have used this model to explain the existence of older deteriorating neighbourhoods and vacant commercial and industrial sites in the urban core as many firms follow the higher income consumers to the peripheral regions (De Sousa, 2006; McCarthy, 2002).

The Chicago School's early conceptualization corresponds to post WWII theories of agricultural land rent. In the early history of modern economic theory, it was assumed that land had value as an input to agriculture (Dickenson & Lloyd, 1990). This assumption formed the basis for the urban bid-land rent theory developed by William Alonso (Nijkamp et al., 2002). Bid-rent theory refers to the variations in land rents payable by different users with distance from some point in the market, usually the CBD (Alonso, 1960). At the core of the theory is the idea that since transport costs rise with distance from the market, land rents generally tend to decrease correspondingly, but different forms of land use generate different bid-rent curves. Land users all compete for the most accessible land within the CBD. The amount they are willing to pay for this land is called rent (Alonso, 1960). This theory is based upon the reasoning that the more accessible an area is, the higher a firm's profits will be. In this model, land-uses that need a central location, close to the market, such as retail will outbid others activities like traditional manufacturing and industrial sites. The result is that manufacturing sites and other industrial firms move to out to the periphery where land is cheaper. Overtime, this process leaves behind abandoned factories and manufacturing sites closer to the urban core.

Later theories of land-use change considered other factors, besides competition and rent-paying ability, such as race, ethnicity, lifestyle, religion, age and values, all of which contributed to shape the urban landscape (Boal, 1976). These theories viewed segregation within certain ethnic neighborhoods near the urban core as the result of residential choices to be near socially similar residents and supportive networks. This is achieved by choice but in some cases is forced upon new in-migrants who are prevented from locating where they choose but rather, through ethnic ties are forced to locate in close proximity to their ethnic group (Boal, 1976). By joining an ethnic cluster, members of that particular group may reduce their isolation and increase their sense of security and familiarity. This sense of security is manifested in the physical and ethnic homogeneity of the residential area. The equating of homogeneity with security is one of the factors lying at the heart of the North American suburban flight. These suburban ethnic neighborhoods would be protected by racial, economic and ethnic homogeneity and by distance from other population groups (Boal, 1976). By joining ethnic clusters and creating ethic neighborhoods, certain areas of residence and employment within the city are abandoned thus creating vacant or underutilized properties.

In the late 20th Century, Harvey (1989) posited a theory on locational choice based on constraints of rent-paying ability and racial discrimination. According to this conceptualization, a high proportion of in-migrants into cities tend, initially, to occupy undesirable positions in the economic structure of that particular society. Given their low economic position, their choice of where to live is limited. Thus only the lowest housing can be entered by these groups (Harvey, 1989). The poorest quality housing locations are usually found in the innermost areas of the city, or where lesser quality redevelopment is significant. Such concentrations are due to the prevalence of low land values. However,

high-status in-migrants or those with free mobility and economic rent-paying ability relocated to the suburbs, leaving low-income residents and certain industries with little choice but to remain in the older deteriorating neighborhoods close to the urban core, some of which contained potentially contaminated and abandoned commercial and industrial properties (McCarthy, 2002). Due to the low economic status of the demographic in these areas, reinvestment into these decaying properties was minimal and thus the sites remained in a state of deterioration.

Recent conceptualisations of the processes underlying the globalization of production help explain the trend away from traditional manufacturing in the old industrial cities. Globalization has brought about many shifts, namely a shift in the modes of production. Globalization has opened up a period of restructuring and fundamental switch of manufacturing from one region to another. The old system of mass production dominant in the mid-twentieth century in North America has been replaced by flexible production systems, which are characterized by progressive vertical disintegration of production with numerous producers of different sizes caught up in a tightly weaved structures (Storper & Scott, 1992). In these networks, groups of interrelated industrial establishments tend to locate close to one another to facilitate exchanges of goods and information, and to take advantage of external economies in labour markets and infrastructures (Storper & Scott, 1992). The economy of flexible production brought into existence a series of drastically different and new core regions of production known as industrial districts. This has also resulted in a new international division of labour in which the various phases of production process are differently allocated across time and space (Storper & Scott, 1992). In this view, advanced technical and managerial tasks are assigned to core regions mainly in the developed world, while routine, low-skill, labour

intensive activities are allocated to the periphery – the developing world, where labour, rent and cost of production are comparatively cheaper than in the core regions (Storper & Scott, 1992). In this new international division of labour, firms in the developed world relocate to the suburban extensions of old production centres, while the traditional labour intensive manufacturing firms that once dominated the central core of cities are relocating to lower-cost areas (Storper & Scott, 1992). The flexibility of industrial modes of production has contributed to the rise of abandoned and underutilized industrial buildings.

In more recent conceptualizations of urban development and change, the monocentric model has evolved to incorporate the development of edge cities and the urban realm models (Garreau, 1991; Vance, 1990). In edge cities and urban realms there needs to be a range of activities sufficient to allow such places to operate daily functions independent from the urban core (Garreau 1991; Vance, 1990). Retail trade and services need to be available so that the residential population need not travel into other areas. In addition, jobs would have to be present as well. These areas are self sufficient suburban centres (Garreau, 1991; Vance, 1990). In both edge cities and urban realm models, the metropolitan political fragmentation that results from the exodus to these new areas of the suburban extension can hinder central city efforts to tackle brownfields. The outward trend of people and businesses to independent suburban jurisdictions has not only resulted in vacant properties throughout the core but also has changed the demographic structure of inner city. Because it is typically the more affluent members of society that move to these suburban jurisdictions, those with lower socioeconomic status are left to inhabit the inner city (Garreau, 1991).

With regards to what the future holds for land use change, the theory of neighborhood life cycle change posits that the process of development is cyclical

(Bourne, 1981). In this conceptualization the cycle begins with suburbanization or new growth. In this initial phase, development is characterized by large scale projects mainly consisting of low-density, high-income single family dwellings. The next stage is in-filling on vacant land. Here development is characterized by smaller scale progressive projects mainly consisting of multi-unit apartment buildings housing multiple high-income families. The next stage is downgrading, here we have the conversion of existing dwellings into high density multi-unit apartment style housing. The socioeconomic status here is beginning to decline as well. Following this is the thinning out stage; here we have the demolition and abandonment of existing units with a high rate of out migration. In the final stage of renewal or rehabilitation we see the level of construction rise dramatically. Most development is focused on luxury apartments and townhouses. Further, in-migration greatly increases as does the population density and socioeconomic status of those moving in (Bourne, 1981). Most abandoned brownfields are in neighborhoods that are in the thinning out stage and according to the theory of neighborhood change are not likely to enter into the renewal stage in the near future (McCarthy, 2002). What is more, Greenberg et al. (2001a) has shown that only a small percent of the population are actually willing to live in remediated sites.

2.3 Situating Brownfields within the context of Sustainability and Smart Growth

In recent years, land use changes and issues of sustainability have become a focal point of policy analysis. Reasons for this renewed interest are mainly environmental threats imposed by climate change, deforestation, desertification, biodiversity loss, agricultural production, and soil pollution. Since land use is directly related to various types of environmental externalities, it is thus at the centre of the sustainability debate.

Today's cities, as currently planned and developed, are not sustainable in a global environmental sense (Roseland, 2000). Today, over half the world lives in cities; in the developed world over eighty percent of the population reside in urban areas; in the developing world, growth and urbanization are occurring at accelerating and unprecedented rates (Bugliarello, 2006). The rate and scale of current urban growth are unparalleled in history and so, any discussion of sustainability must consider the sustainability of cities and their effect on the stock of resources in the ecological, social and economic environments.

It is within this context that the redevelopment of brownfield sites is situated. Under the rubrics of smart growth and sustainable development, this section will attempt to provide the theoretical context of brownfield redevelopment. Another objective is to show that brownfield redevelopment represents an application of the principles of sustainable development and smart growth. To achieve this goal, I will begin by a discussion of the definition of sustainable development. Following this will be a section focussing sustainable development in the context of urban issues. Next, a section outlining the issues associated with smart growth will be offered. After this, a section detailing the major issues of brownfield redevelopment in urban areas as it relates to the sustainability debate will be offered.

Sustainable development is commonly defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Bugliarello, 2006; Geisinger, 1999; Jabareen, 2008; Roseland, 2000). This is the term's most basic definition but the concept is fraught with contradictions and differing interpretations of what is actually means. It can be argued that a comprehensive theoretical framework for understanding sustainable development is lacking from the

theory. Moreover, there are no clear guidelines stipulating how theoretical constructs of sustainable development can be practically applied (Jabareen, 2008). According to Jabareen (2008) the multiple interpretations and applications of sustainable development is a result of competing interest groups redefining its meaning to suit their own agendas. Nonetheless, Geisinger (1999) asserts that all interpretations of sustainable development consider the principle as a compromise between economic development and environmental protection. Further, economy, environment and social equity are three of the most central components of the sustainability concept and that maintaining a balance between the three is the overarching goal (Geisinger, 1999). Bugliarello (2006) stresses the environmental component and asserts that a sustainable society is one where, equity, welfare, and economic stability are dictated by environmental limits. Williams & Dair (2007) consider the time factor and state that sustainability requires the integration of social, environmental and economic development in a way that is equitable and enduring. Advocates of sustainable development accept that applying it involves a fundamental change in global systems of production but that this change has to allow for continued economic prosperity yet not at the expense of the planet's ecosystems (Roseland, 2000). The debate about definitions of sustainable development has been ongoing for over 20 years but most are of the view that economic growth is necessary for sustainability as it provides the financial resources for technical advances required to solve problems of environmental exploitation (Williams & Dair, 2007). At this point, the discussion will now shift its focus to a discussion of urban sustainability.

With the unparalleled growth of urbanization now comprising over half of the world population, global sustainability is now an issue of urban sustainability (Bugliarello, 2006). Alkar & McDonald (2003) add that planning and development over

the last few decades in industrialized cities has resulted in circumstances that are environmentally unsustainable. Current urban systems of growth have caused a number of environmental impacts which are at odds with the tenets of sustainable development (Roseland, 2000). According to Alkar & McDonald (2003), the only way to halt the progression of this type of unsustainable development is to adopt the principles of sustainable development in the planning process. Carter & Fortune (2007) agree and support the view that if policy makers wish to improve the quality of life in urban areas, they must incorporate elements of sustainability into urban planning. It has already been stated that sustainable development is a contentious concept and so it follows that urban sustainability is an equally contentious subject. Bugliarello (2006) defines urban sustainability as a city's ability to survive without compromising the cities and environments in the rest of the world. Like the concept of sustainability, urban sustainability also gives equal weight to the environment, economy and society (Carter & Fortune, 2007).

Sustainable urban development implies the need to maintain a higher quality of urban life without endangering the likelihood of continued advancement for further development of future generations (de Shiller, 2004). Bugliarello (2006) claims that if cities are to be sustainable, they must reduce their external footprints and become more liveable in terms of transportation, housing, water and power conservation, employment, congestion management and reduction of noise and air pollution. Sustainable urban development suggests the need to improve existing conditions and involves the concentration of new development in existing urban areas thus efficiently utilizing the current built-up area (Alkar & McDonald, 2003; Bugliarello, 2006; Carter & Fortune, 2007; de Shiller, 2007, Roseland, 2000). To assure the sustainability of cities, attention to

the various needs of current and future populations is necessary in the urban planning process (Chan & Lee, 2008). Alkar & McDonald (2003) state that the sustainability of cities is dependent upon the reduction of automobile dependency and an increase in the provision and conservation of green spaces. Carter & Fortune (2007) add that the reduction of automobile dependency can be achieved by investment in sustainable forms of public transport and the creation of walkable and pedestrian-friendly environments. To a large extent, the principal ideals of sustainable urban development correspond to the tenets of the compact city (Roseland, 2000).

Ultimately, urban sustainability points in the direction of dense patterns of development (Bugliarello, 2006). A high population density implies shorter distances between functions and accommodates the use of public and environmentally-friendly means of transport which contribute to lower energy use, protection of biodiversity and the prevention of sprawl (Alker & McDonald, 2003). Urban sustainability incorporates community involvement in planning decisions and advocates integrated strategies for managing resources and infrastructure. Therefore, creating a detailed planning policy and an integrated framework for achieving economic development is instrumental to urban sustainability (de Shiller, 2004). Urban renewal in the form of infill development is commonly adopted to manage a degrading urban environment, to rejuvenate decaying urban areas and meet various socio-economic objectives.

However, achieving the goals stated above requires all stakeholders to consider development within the context of the locality but still paying significant attention to regional and interregional demands. This involves the evaluation of social, economic and environmental aspects of development that contributes to the overall concept of sustainable development (Carter & Fortune, 2007). Furthermore, in order to achieve

sustainable urban development, planning decisions are of paramount important, as they directly impact the quality of life in cities by altering environmental conditions over time (de Shiller, 2004). Planning for sustainable urban development must be developed in a way that incorporates long-term goals and considers the environmental, social and economic consequences of various developments (Naess, 2001).

A problem with the application of urban sustainability is that some perceive it to be opposed to economic development (de Shiller 2004). However, Alkar & McDonald (2003) note, that when principles of sustainability are taken into account in the planning process the result is an increase in the value of the newly (re)developed land. Another challenge of urban sustainability is translating policy into practice; this requires a common understanding of the individual features of sustainable development and Carter & Fortune (2007) believe this common understanding is absent. The collection of principles, definitions and initiatives relating to sustainability is considerable. They range from the overly broad to the extremely complex and detailed. As a result, there is a lack of a common framework for understanding and applying principles of sustainability in the urban design process (Carter & Fortune, 2007). Integrally related to the ideals of sustainability and urban sustainability is the concept of smart growth. All three concepts are united through their goals of improving the current state of our communities and ensuring positive outcomes for the future.

In addition to adopting principles of sustainable development, over the past few decades, planners, politicians and communities have relied upon various strategies motivated by the smart growth movement to provide an alternative to existing urban structure exemplified by low density, segregated and automobile-dependent forms of development (Talen, 2003). Smart growth proposes an urban form characterized by high

density development, streetscapes conducive to walking and interlinked regional transportation heavily based on public transit. Moreover, smart growth aims to promote a sense of community and improve the quality of life in urban areas (Bunce, 2004; Filion & McSpurren, 2007; Mayer et al., 2002). The cultivation of compact and mixed-use forms of development and the support of infill and brownfield redevelopment are also considered to be applications of smart growth (Greenberg et al., 2001b). With these goals in mind, it is commonly understood that smart growth's main objective is to tackle sprawl, which is considered to be a major cause of current urban forms' inability to be sustainable (Filion, 2003). Nonetheless, the ideals of smart growth converge on the notion of the compact city, which is based on ideas of increased population density, the reuse of existing urban infrastructure, and intensified residential and commercial streets. This model is increasingly considered to be a stronger form of urban development than current design (Bunce, 2004). Highly implicit in such policies is the supposition that a meaningful portion of development needs can be met by redeveloping or reusing underutilized, abandoned sites in urban areas (Mayer et al., 2002). Most smart growth policies recommend developers to adhere to these principles, while at the same time allowing expected growth to occur at a sustainable rate (Mayer et al., 2002).

A major challenge facing smart growth is how much current growth patterns can be transformed in an atmosphere where administrations, consumers, developers and economic systems favour sprawl (Filion, 2003). The literature on smart growth praises its potential, however critics of the concept claim that these achievements have failed to reach the scale needed to realign urban development trends (Mayer et al., 2002). It has been observed by Filion & McSpurren (2007) that smart growth strategies tend to be locally produced and applied rather than regional in nature. Without strategies that are

implemented with regularity over extended periods of time over entire metropolitan regions, the success of smart growth campaigns will be compromised.

Bunce (2004) cautions that those wishing to adopt principles of smart growth must be weary of the hidden agendas in policies anchored in smart growth. In some instances claiming to adhere to smart growth is merely a policy aimed at economic revitalization. Bunce (2004) explains that addressing issues of urban sprawl is used as a means of gathering public support for increased development in existing urbanized areas. In this way the environmental externalities of regional sprawl serve as a public rationale for enhancing economic development mostly through private-sector funding and the attraction of skilled labour (Bunce, 2004). Implicit in this argument is the assumption that if residents do not approve of intensification, then they can be thought of as being opposed to environmental conservation. In spite of the motivations behind the adoption of urban sustainability and smart growth, the redevelopment of already existing infrastructures seems to be a common strategy to combat sprawl and environmental degradation.

It is within this context that brownfield development has arisen as a major feature in initiatives to revitalize urban areas (Raco & Henderson, 2006). Brownfield redevelopment is considered to have a number of positive outcomes such as the reduction of development pressure on greenfield sites, the restoration of former landscapes, the establishment of new areas of ecological value, the enhancement of environmental quality, the renewal of urban cores, the restoration of the tax base, and the utilization of existing infrastructures (De Sousa, 2003). Given the strong emphasis placed on sustainable development in the current political environment it comes as no surprise that brownfield redevelopment is now heavily stressed in urban policy (Dixon, 2006). The

redevelopment of brownfield sites can be considered an effective method in tackling the structural problems facing cities today (Raco & Henderson, 2006). The redevelopment of brownfield sites is employed as a strategy to prevent urban sprawl, deliver more compact cities, reduce out-migration and the need to travel, divert investment from overly congested areas, and reduce greenfield development (Dixon, 2006; Raco & Henderson, 2006; Williams & Dair, 2007).

A sustainable brownfield development is one that has been produced in a sustainable way and which provides a physical environment that enables end users to undertake their activities more sustainably (Williams & Dair, 2007). Dixon (2006) maintains that sustainable brownfield regeneration involves the rehabilitation and return to productive use of brownfields in such a way as to guarantee the achievement of human needs for present and future generations in environmentally sensitive, economically viable, and socially acceptable ways (Dixon, 2006).

Current definitions of sustainable brownfield redevelopment are vague and unspecific. Williams & Dair (2007) outline that for a brownfield redevelopment project to considered be sustainable, it must enable businesses to be competitive, support local economic diversity and provide employment opportunities, it must adhere to ethical standards during the development process, provide adequate local services, provide housing to meet local needs, integrate the development within the locality, provide high quality, liveable developments and conserve local culture and heritage, minimise the use of resources, minimise pollution and protect biodiversity and the natural environment (Williams & Dair, 2007). To further assure the sustainability of brownfield redevelopment, the provision of adequate local services and facilities, including open space, shops, schools and healthcare facilities, as well as integrating the development

within the locality, in terms of transport and related infrastructure is necessary. Finally, providing high quality liveable developments that promote liveability and community participation, and conserve local culture and heritage are also important (Dixon, 2006). However, the notion of sustainable brownfield redevelopment is not without its challenges.

Dixon (2006) claims that there is a lack of clarity in the definition of sustainable development and the need to develop indicators to assess and measure the sustainability of brownfield redevelopment projects is paramount to successful outcomes (Dixon, 2006). As a result of this obscurity in the definitions and interpretations of sustainable brownfield redevelopment, translating policy objectives into practice at a site level can be difficult (Dixon, 2006). According to Nijkamp et al. (2002), to achieve sustainable brownfield redevelopment and improve the conditions of urban decay, policy must pay attention to environmental concerns, but in most cases total regeneration for the whole city in a time span of one generation is an unrealistic goal.

Redeveloping brownfields is frequently presented as having broader economic, environmental and social benefits. However, Raco & Henderson (2006) suggest that too much is expected from brownfield redevelopment projects and that wider benefits will only be gained if redevelopment schemes are incorporated within a wider and more inclusive set of policy initiatives. Raco & Henderson (2006) further point out that the redevelopment of brownfields may actually be a practice in unsustainability because focusing development in one area may make that area more competitive thus damaging the prospects for brownfield development elsewhere by diverting investment from other places. Redevelopment projects may also negatively impact the local community through increased pollution, congestion and may even push some of the local residents out through increased property values

initiated by the process of gentrification (Raco & Henderson, 2006). As a result, Raco & Henderson (2006) contend that redevelopment needs to be conceptualized in relation to broader patterns of development. Only by adopting a coordinated approach that looks at individual brownfield sites as they relate to the entire urban region will redevelopment be successfully sustainable. In addition, Williams & Dair (2007) point out that the redevelopment process is complex and the implementation of a project requires involvement by numerous stakeholders, none of which have overall authority or power to enforce sustainability. Nijkamp et al. (2002) agree and state that redevelopments are based on conflict between various interests, including developers and community, local and regional stakeholders, and different government agencies and only through a balanced and coordinated planning process will redevelopment schemes be successful.

Sustainability, smart growth and brownfield redevelopment are three interconnected and contentious topics of study. Not until a comprehensive framework for understanding sustainability is provided can the notion of brownfield sustainability be fully understood. Regardless of this, it is typically understood that brownfield redevelopment has numerous environmental, social and economic benefits and subscribing to policies that adhere to standards of sustainability have environmental, social and economic benefits as well. Taking this chain of thought one step further, it can be logically argued that brownfield redevelopment represents an exercise in sustainability. The formula is simple, brownfield redevelopment is an application of smart growth and urban sustainability and these two concepts are dictated by the terms set forth by the overarching concept of sustainable development. However, even though brownfield redevelopment can be considered an exercise in sustainability and smart growth, it is only one of many methods of achieving urban sustainability and alone will

not be successful in achieving sustainability for an entire region. Only through an application of a coordinated, comprehensive and holistic approach to urban sustainability over the long-term can we expect to experience sustainable outcomes.

2.4 Conclusion

This chapter has presented a discussion and explanation on the rise of brownfield sites across post-industrial cities. Furthermore, I have situated the issue of brownfield redevelopment in the broader theoretical frameworks of sustainability and smart growth. In the next chapter, I proceed to present an argument advocating the need for cities to create inventories of brownfield sites as well as offer a methodology to do so.

Chapter 3: Towards a Database of Brownfield Sites

3.1 Introduction

Various levels of government in Canada lack knowledge about the extent of brownfield sites within their jurisdictions (NRTEE, 1997). Some sites are easily identifiable, but others become masked by layers of redevelopment. However, it is critical for planners and policy makers to know the extent of a city's brownfield supply for them to be able to create effective policies and legislation for redeveloping them and before developers and municipalities make large monetary investments. Thus, former, current, and future sites need to be identified.

In addition to the immense amount of information needed to deal with a brownfield effectively, there are many other factors such as cost, market conditions, infrastructure limitations, efficient planning policies, risk and liability issues that may impede the effective redevelopment of these sites, however, knowing *where* and *how* many brownfields there are should be considered the first hurdle to overcome in the redevelopment phase.

Guidelines for identifying a brownfield will help identify and assess both contaminated and non-contaminated sites. There is no unified and universally applicable method to identify brownfield sites (see also Herbele & Wernstadt, 2006). Relatively little research has been conducted on creating an efficient and effective methodology to identify and manage brownfield sites. In Canada and the US, land-related brownfield information is somewhat limited and existing databases of sites use varying standards and

criteria for collecting and cataloguing information and, thus, are inconsistent (Frickel & Elliot, 2008; Herberle & Wernstedt, 2006; NRTEE, Page & Berger, 2006).

The image of a brownfield brings to mind massive sites littered with industrial residue and decaying and polluted structures that represent an urban blight. The literature does not suggest that clearly defined and mutual assumptions exist about the size or scale of brownfields. The general assumption is that most are large industrial complexes, yet little is known about smaller sites, such as gas stations or machine shops, nor is much known about the distribution of these smaller sites (Herbal & Wrested, 2006; Frickel & Elliot, 2008). With this in mind, I believe the identification of brownfields in a given city is critical, and I propose an effective method to do so. The purpose of this chapter is to address my first research objective as listed in Chapter 1.

The remainder of the chapter begins with a brief overview of literature on brownfield identification and management, followed by a discussion of implementing a Geographic Information System (GIS) to build, manage, and analyze a database of brownfield sites. The chapter also discusses the various cartographic and nominal sources drawn upon to build this system. I then describe the proposed identification and management method. Following this I present some preliminary results of this method. Finally, I discuss the benefits and shortcomings of this method of identification.

3.2 An Overview of Research on Brownfield Site Identification and Management

Research on all aspects of brownfields has expanded significantly in recent years. The majority of studies have focused on the technical aspects of site remediation and on issues of policy-making and planning implications (Greenberg et al., 2001; McCarthy, 2002; Alberini et al., 2005; De Sousa, 2005; Bliek & Gauthier, 2007; Dixon & Adams,

2008). Most studies have focused on a particular locale's experience with: 1) various economic incentives created to promote successful redevelopment; 2) barriers to private-sector barrier remediation; and 3) liability issues (Adams et al., 2000; Alberini et al., 2005; Herberle & Wernstedt, 2006). Other studies have focused on how brownfield regeneration is important to increasing housing supply and generating environmental benefits, such as the reduction of sprawl, urban renewal, improving the social conditions of local communities, attracting investment to older centers, and environmental clean-up (see Alkar & McDonald, 2003; Dixon & Adams, 2008; Roseland, 2000). Some researchers make the claim that brownfield redevelopment is the best smart growth option available to planners and policy makers (Franz et al., 2001; Greenberg et al., 2001b).

Although the purported environmental, economic, and social benefits of brownfield regeneration have received tremendous attention in the academic literature and policy circles, these studies have been criticised for being too narrow in their scope and not drawing sufficient linkages with the wider community and regional goals. In particular, McCarthy (2002) has argued that to be successful, any brownfield rejuvenation policy must be connected to broader community goals, such as curbing urban sprawl, promoting smart growth, and revitalizing the central city area. Other scholars have expressed similar views, notably De Sousa (2003), who outlined the viability of turning these once-contaminated sites into urban green spaces, including parks, trails, and playgrounds. De Sousa (2005) also argued that brownfield redevelopment needs to be understood in terms of broader social, economic, and environmental objectives. Williams & Dair (2007) also explained that a successful brownfield redevelopment project is one that is economically, socially, environmentally sustainable, and more importantly connected to wider sustainable development strategy. Similarly, a sustainable brownfield

redevelopment project is one that supports local economic diversity, provides housing to meet local needs, integrates the development within the locality, and preserves local culture and heritage (Raco & Henderson, 2006; Carter & Fortune, 2007).

Raco & Henderson (2006) suggest that too much is expected from brownfield redevelopment projects and that wider benefits will only be gained if redevelopment schemes are embedded within a wider and more comprehensive set of policy agendas. As a result, Raco & Henderson (2006) contend that redevelopment needs to be conceptualized in relation to broader patterns of development. Only by adopting a coordinated approach that examines individual brownfield sites as they relate to the entire urban region will redevelopment be sustainable.

Although these studies are important, they fail to consider the key variable in the brownfield equation: the sheer scale of the issue. I contend that before a brownfield redevelopment project can be connected to broader community goals, or before planners and policy makers introduce mechanisms to encourage redevelopment, the number, location, and extent of potential sites in any one place must be known. Policy and economic incentives cannot be fully realized until planners, policy makers, private investors, and the public know how to assess brownfield sites on a city-wide basis. I propose an efficient and effective GIS-based methodology for identifying brownfield sites.

Unfortunately, systematic studies of brownfields that would allow an appraisal of similar features across a wide array of sites are not well developed. Such studies are inherently difficult (Herbele & Wernstedt, 2006), and little has been done to identify these sites. Frickel & Elliot (2008) have outlined the need to identify these sites and present a method to identify current and past hazardous sites. The authors begin by listing

polluting industries and then cross reference this list with manufacturing directories of a particular city. Using this approach, they are able to identify businesses operating in the polluting industries. While this method is useful, Frickel & Elliot (2008) did not present a comprehensive identification method that considers smaller industries or sites not engaged in manufacturing, such as gas stations, warehouses, auto-machine shops, or chemical facilities. (For a comprehensive list, see Tables 3.1 and 3.2)

Table 3.1: Industries as Potential Sources of Contamination:

Leather and Allied Products
  Tanneries
Primary Textile Industries
Textile Products Industries
  Carpet, Mat and Rug Industry
Paper and Allied Products
  Pulp and Paper Industries
Clothing Industries
  Hat and Cap Industry
Printing, Publishing and Allied Industries
Primary Metal Industries
  Iron Foundries
  Brass Foundries
  White Metal Alloys
Fabricated Metal Products
  Boiler Making
  Stamped, Pressed and Metal Coated Products
  Wire and Wire Products
Transportation Equipment and Industries
  Railway, Rolling Stock Industries
Electrical and Electronic Products Industries
  Battery Industry
Non-metallic Mineral Products Industries
Refined Petroleum and Coal Products Industries
Asphalt/Tar Paving Industries
Chemical and Chemical Products Industries
Railway Workshop and Roadhouses
Large Cleaning and Dying Works

Table 3.2 Types of Potentially Contaminated Sites

Type of Site
Municipal/City Dump Sites
Landfill Sites
Disposal sites for industrial chemicals and wastes
Ocean Dump Sites
Toxic and hazardous waste disposal sites
Injection wells for disposal of liquid wastes
Tire burning and storage facilities
Bio-hazard storage sites (Hospital waste disposal sites)
Radio-active waste disposal/storage sites
Primary industry sites
Sites affected by livestock wastes (farms, slaughterhouses, cattle transport stations)
Sites affected by fertilized fields
Sites affected by pesticide application/spillage
Mining sites
Manufacturing sites
Creosote processing site
Chemical processing and transport site (Plant sites, train stations, truck loading stations, harbours)
Wood preservation facilities
Former coal and gasification plants
Asphalt production and equipment cleaning sites
Oil refinery sites
Road salt storage areas
Scrap metal sites
Automobile wreckers
Gas stations
Dry cleaners/commercial laundry facilities
Armed Forces sites
Weapons testing and storage sites
Locations of one-time spills
Underground storage tanks
Sites affected by severely contaminated water or air
On-site septic systems
Land spreading of sewage or sewage sludge
Sites affected by leaky sewer lines
Sludge farming and sludge disposal areas at petroleum refineries
Sites affected by fly ash from coal-fired power plants
Sites with leaky tanks or pipelines containing petroleum products
Sites affected by contaminants in rain
Sites affected by snow and dry atmospheric fallout
Sites affected by runoff of salt and other de-icing chemicals from roads and highways
Sites used illegally for dumping of wastes
Liquid waste lagoons
Sites containing building materials (construction sites)
Residences
Sites affected by high levels of naturally occurring substances
Abandoned or under-utilized commercial facilities (former gas stations, laundries, car washes)
Abandoned or under-utilized industrial facilities (abandoned mines, wells, factories, industrial sites)

Source: NRTEE (1997)

Presently, no unified set of guidelines for identifying individual brownfield sites exists. Page & Berger (2006) attempted to survey and catalogue a variety of sites across the United States. They studied and analyzed 1,415 types of sites. Nevertheless, the objective of their study was not to discover sites or to detail methods for identifying potential sites; indeed, the sites they studied were already listed in a state-operated database of sites in some phase of remediation. Instead, Page & Berger (2006) attempted to identify commonalities in lot size, past use, current use, and location. They analyzed the characteristics of the sites to determine whether their results were consistent with commonly held assumptions about brownfield sites, particularly industrial history.

The most comprehensive set of instructional guidelines for identifying the scale of the brownfield problem at a national level was produced in Canada by the National Round Table on the Environment and the Economy (NRTEE), a federal government-affiliated agency which produced a report titled "Improving Site-Specific Data in the Environmental Condition of Land." The NRTEE recommended using a variety of sources and databases to identify brownfield sites in Canada; however, a number of the sources cited by the NRTEE are inaccessible to the general public. Furthermore, the sources they recommend vary from city to city and province to province. NRTEE does describe the usefulness of fire insurance plans and city business directories.

De Sousa (2006a) attempted to compile inventories of brownfields and determine the extent of the brownfields problem in Canada by distributing a mail survey to 55 Canadian cities. Respondents were asked to estimate the quantity of brownfields in their municipalities. Only 24 cities responded. Two were in possession of formal brownfield inventories, 9 were in the process of developing an inventory, and 13 had no inventory. Twelve cities provided only estimates. The number of brownfield sites ranged from zero

to 1,000. Based on survey results, municipalities do not have a standard approach for developing brownfield inventories, which is consistent with provinces and the federal government in Canada.

In an earlier paper, De Sousa (2005) attempted to examine the scale of the brownfield problem in Milwaukee, Wisconsin (U.S.). The author based his study on various government and municipal sources, which tended to focus on tracking financial assistance. Therefore, the data De Sousa (2005) gathered reflected projects that received financial assistance from government and did not include those that may have been assisted in other ways. The author attempted to ensure standardization of the data, but outlined several problems inherent in this approach. Municipalities did not collect data for equal periods of time, and they employed diverse definitions of what constitutes a brownfield. Some municipalities reported individual projects, and others reported mixed-use projects. Finally, some jurisdictions only reported on large flagship projects.

In the next section, I describe a process that can be used to effectively compile an inventory of brownfield sites for a given city.

3.3 Building a Comprehensive Database of Brownfield Sites in GIS

In London, contaminated sites are widely dispersed and not highly concentrated in one geographic area. The City does not have a comprehensive inventory of brownfield sites. The City of London does not consider it feasible to compile an exhaustive inventory of all sites in the City due to the prohibitive cost, and restrictions on access to private property (City of London, 2006).

Building a comprehensive database of brownfield sites is clearly a worthwhile project for municipal governments, providing a tool to aid in the management and

redevelopment of these sites; however, the creation of such a system can be costly in both time and monetary terms. As such, it is important to construct a GIS that is flexible, acknowledging both the present and future requirements of the system. The limitations of the data must also be appreciated. This methodology involves historical data sources to track brownfield sites; consequently there are often gaps in available data. The GIS must also be able to easily integrate future data that might become available.

A series of historical cartographic sources, notably fire insurance plans (FIP), provide detailed information about the location, hazards and uses of a site. I discuss methods of their digitization and 'georectification' within a GIS so that the information they contain may be exploited in the digital era. The GIS provides a platform to link additional data to these plans, expanding upon and adding to the information they contain. Supplemental industrial and business listings, such as those found in the annual city directory, are mapped to their correct spatial orientation using street addresses.

3.3.1 Georectifying Cartographic Sources

One of the main sources of the proposed system is a series of cartographic representations that document the city through successive eras of development. It is important to have a history of the past conditions of the city in order that the contemporary situation may be fully understood. Sources that provide information on the city's past include air photos, topographic maps, and surveys; sources typically available at local libraries and archives. Another valuable source, fire insurance plans, are available for most cities and towns across Britain and North America (Dubreuil & Woods, 2002; Rowley, 1984); I recommend fire insurance plans to extensively detail historical conditions in London, Canada.

Since they were used by the fire insurance industry, a pedantic profession, the fire insurance plans provide a detailed and accurate representation of the city which was used to determine insurance premiums (Moulder, 1993; Tebeau, 1997). Rates were assessed by determining the risk that a structure would catch fire, or spread from a neighbouring one. The plans thus contain detailed information on the built environment in order to evaluate fire risk, including construction materials, building sizes, and relation to neighbouring structures. Further information is presented pertaining to the uses of the building, including occupants and certain internal hazards (e.g. boilers, fuel tanks). The most detailed information is presented for larger buildings of industrial or commercial uses since these were most likely to burn (Bloomfield, 1982; Novak, 2006). Tunbridge (1986) uses the detailed depictions of warehouse structures to discuss their potential in revitalizing the inner-city in Ottawa. Thus, the fire insurance plans are a detailed document depicting historical urban landscapes which are useful in determining past hazardous uses which might result in the buildings being considered contemporary brownfields.

The past tenant of a building might suggest potential hazards from residues left from their tenure, resulting in contemporary problems in the site's redevelopment. Heavy industries, such as engine works, would likely have contained machinery powered by coal or gasoline; any residue of these historical uses might cause problems for contemporary users. Similarly, identifying the location of former commercial enterprises such as gasoline stations or dry cleaners could also indicate potential problems. Not only do the names of tenants shown on the FIPs represent evidence of a potentially contaminated site (e.g. "Johnson's Paint Factory"), but the plans also detail interior layouts and specific hazards within the larger buildings. For these structures the plans typically denote

possible sites of fire ignition such as boilers and gas tanks; items which may cause problems for a contemporary inhabitant.

The fire insurance plans provide a comprehensive data source which can be used to document potential hazards from past uses, and have long been employed by researchers, city planners, engineers and environmental consultants to identify conditions of a site (Moulder, 2003). For the most part these users tread to the depository where the plans are stored to flip through numerous plates to find the site of interest. I propose that cities should undertake a program to scan these plans into digital format for use within a GIS. This process, although requiring an initial investment of labour, would eventually reap many benefits. No longer would an individual employee, consultant or researcher have to travel offsite to obtain the data, since it would be stored in digital format and therefore could potentially be made accessible to anyone from anywhere. Furthermore, the mere process of scanning these plans preserves them from eventual degradation and introduces the analytical capabilities of a GIS; for example, plans can be superimposed to observe the morphological and land use changes taking place in intervening periods (Gilliland & Novak, 2006). In addition to the brownfield work, such a documentation of past conditions would benefit many areas of municipal planning and engineering departments, perhaps most notably those responsible for heritage conservation and management.

The large size of most insurance plans – some measure one metre by one metre – necessitates special consideration for converting to digital format. To capture digital images of plans in our studies, large industrial scanners will be required (a flatbed and a drum scanner), as well as a high-resolution digital camera mounted on a tripod. Each system has its pros and cons. The large-format scanners provide the highest-resolution

and relatively distortion-free images; however, the equipment is much more costly, the procedure is more time consuming, and the drum scanner does not handle ancient maps very well, which are sometimes fragile and warped. Use of a digital camera may introduce distortion at the edges of the image; however, this problem is typically removed after the image is georectified. No matter what equipment is used to capture the image, a suitably high-resolution must be set to ensure that the finer details of the plans are not lost. This process results in large digital file sizes; however, with advances in computer storage capabilities (at ever-decreasing costs for memory) this issue has been generally relieved.

Once scanned, the images are rectified to match locations on the plans with known real-world control points using the georeferencing tools available in standard GIS packages. A typical method of rectification involves identifying points on the historical plans and matching them with the same locations in a previously created GIS files (Figure 3.1). The georectification process is extensively detailed elsewhere, but in general requires at least four points to match, preferably at each of the four corners of the sheet (Lo & Yeung, 2002). Lot lines (the legal framework of land parcels) are among the most static elements of the urban environment, and as such, the outside corner points of corner lots at intersections provide ideal control points for georectifying a historical plan to modern spatial coordinates.

Figure 3.1 Georectification

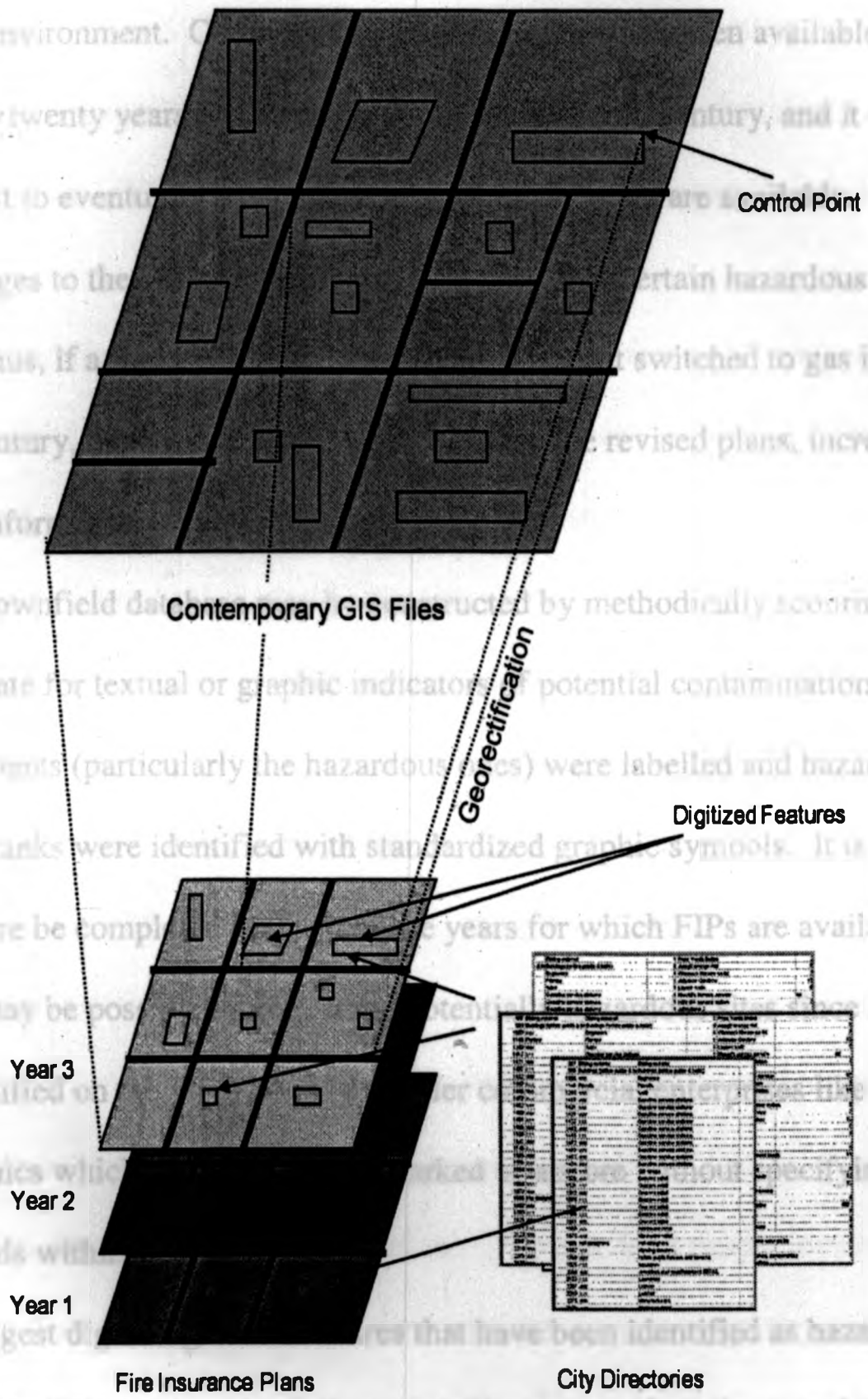


Figure 3.1 Cartographic sources such as fire insurance plans are georectified to the current GIS files using known locations (control points), giving each the same scale and allowing for their layering over time. Features from the plans digitized and records in databases are geocoded to their correct spatial location.

To ensure that fire insurance rates were accurate, the fire insurance plans of a given city had to be kept up to date, and thus were continually modified to reflect changes in the built environment. Complete fire insurance plans are often available for cities every five to twenty years beginning in the mid-nineteenth century, and it would be in a city's interest to eventually scan and rectify whatever years are available. This allows for tracing changes to the built environment, land-uses, and certain hazardous contents of the building. Thus, if a factory originally was coal fired, but switched to gas in the early-twentieth century, this switch would be reflected in the revised plans, increasing the amount of information on a specific brownfield.

A brownfield database may be constructed by methodically scouring each fire insurance plate for textual or graphic indicators of potential contamination. Land uses and/or occupants (particularly the hazardous ones) were labelled and hazardous features such as gas tanks were identified with standardized graphic symbols. It is suggested that this procedure be completed for each of the years for which FIPs are available. Using this method, it may be possible to miss some potentially hazardous sites since not all were clearly identified on the FIPs, notably smaller commercial enterprises like dry cleaners or auto mechanics which could be simply marked as a store without specifying their exact use or hazards within.

I suggest digitizing those features that have been identified as hazards. The footprints of buildings where hazardous activities occurred can be traced in polygon layers and points can be placed for features such as boilers and fuel tanks. Textual datasets pertaining to these digital representations of the features found on the plans can also be added, such as the type of fuel used in a tank, or the building occupant's name. Since the plans have been given proper spatial reference, as outlined above, building a

database from the plans will also be correctly spatially referenced. This will allow for powerful spatial-analytical tools of GIS to be implemented (a discussion of which is found later in this paper). Since this process can be very time consuming, it is recommend to only digitizing those features which have been identified as potential brownfields on the FIPS and/or by the supplemental methodology I outline below.

3.3.2 Expanding the Brownfield Database Using Historical and Contemporary Sources

A digital database of potential brownfield sites can be supplemented using a series of historical city directories to identify the addresses of former land uses that may have left hazardous residues in their locations. City directories are a useful data source for brownfield research as they list every business (and household) by civic address and type of business, and are available annually for most major North American cities since the mid-nineteenth century (Harris & Moffat, 1986). For this study I have chosen to build databases using the city directories for the years 1881, 1916, 1958 and 2008, years that correspond with available fire insurance plans and the contemporary GIS database.

Once the digital database of business entries has been compiled, the GIS is used to map the historical locations of potentially hazardous activities to their present day locations. This may be done manually, plotting a point at its proper location based on street address; however, most GIS software contains an automated tool to perform this geocoding procedure using an address index file. The index file, containing either specific address points or address ranges along a street network, is typically available in most city planning departments. If no such file exists it could be quicker to simply plot the points manually. If a suitable geocoding file is available it will contain address points for the contemporary city; therefore, the historical fire insurance plans or other historical

sources should be used to verify, and potentially modify, the address file to account for any address changes which have occurred over time (in our case study city there have been very few). If fire insurance plans are unavailable or incomplete in spatial or temporal coverage, it would be possible to build a comprehensive listing of potential sites using only the city directory listings. These would not provide the detail contained in fire insurance plans, but would be a suitable substitute if methodically examined using a set of targeted uses as presented in Tables 3.1 and 3.2.

In addition to fire insurance plans and city directories, the brownfield database can be further expanded using a wide range of additional data sources. Historical sources, such as other paper maps, plans, and surveys can be georectified, and textual sources such as newspapers and local industrial histories can also be georeferenced through spatial identifiers. Most cities now contain a geomatics division with large amounts of data about the contemporary situation already available in digital format. Aerial imagery, land inventories and tax assessments all represent layers of data which can be added to the brownfield information system to provide supplementary details for each site in the database, and to help manage their remediation.

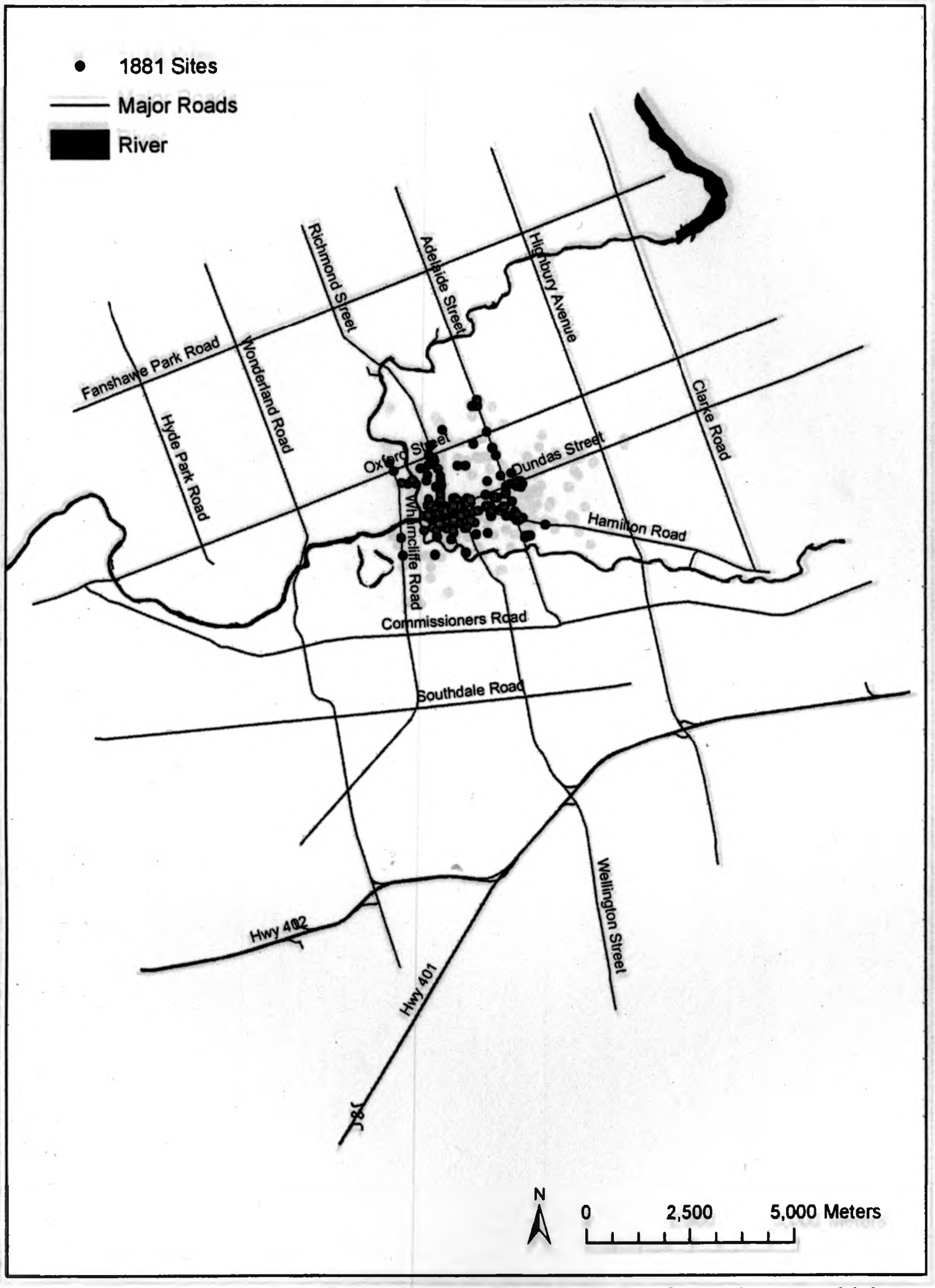
3.4 Preliminary Results

This process of digitizing London's historical built environment through the mapping of fire insurance maps is part of a larger and ongoing project at the Human Environment Analysis Laboratory (HEAL) which specializes in urban applications of GIS at the University of Western Ontario. Since the digitizing of the fire insurance plans is incomplete, I have elected to build a preliminary listing of potential sites using only the city directory listings. Using the method developed, I provide a series of maps plotting the

relative location and amount of potential brownfield sites in London. I say potential because I have not established vacancy or underutilization. There are many issues to consider with publishing a list of brownfield sites. The main issue is land owner rights, because a publicly available list of brownfield sites has the potential of reducing property values, I only provide maps plotting the potential sites. Further, until actual scientific testing of these sites is administered, contamination cannot be determined so one has to tread carefully in what they label a brownfield for fear of liability. It is not my intent to formally label any site as a brownfield as there are liability concerns to consider. In addition, access to private property to establish vacancy or underutilization could not be determined as there are legal issues to consider when attempting to enter private properties.

The following maps show the locations and number of potential brownfields for the following years: 1881; 1916; 1958; and 2001. The final map, displays the aggregate amount of potential brownfields from the selected study years. The maps trace the progression of potential brownfields sites through time. The maps show that in the early years the sites are focused in the core of the City, however overtime, the sites radiate outward from the core to include the entire city. The final map shows that number of potential brownfield sites in London is fairly extensive.

Figure 3.2 Location of Potentially Contaminated Sites, London, 1881



Source: City Directory, 1881. Sites represent directory entries for businesses which many have involved potentially hazardous activities. Please note every site does not necessarily qualify as a brownfield today.

Figure 3.3 Location of Potentially Contaminated Sites, London, 1916

Source: City Directory, 1958. Sites represent directory entries for businesses which many have involved potentially hazardous activities. Please note every site does not necessarily qualify as a brownfield today.

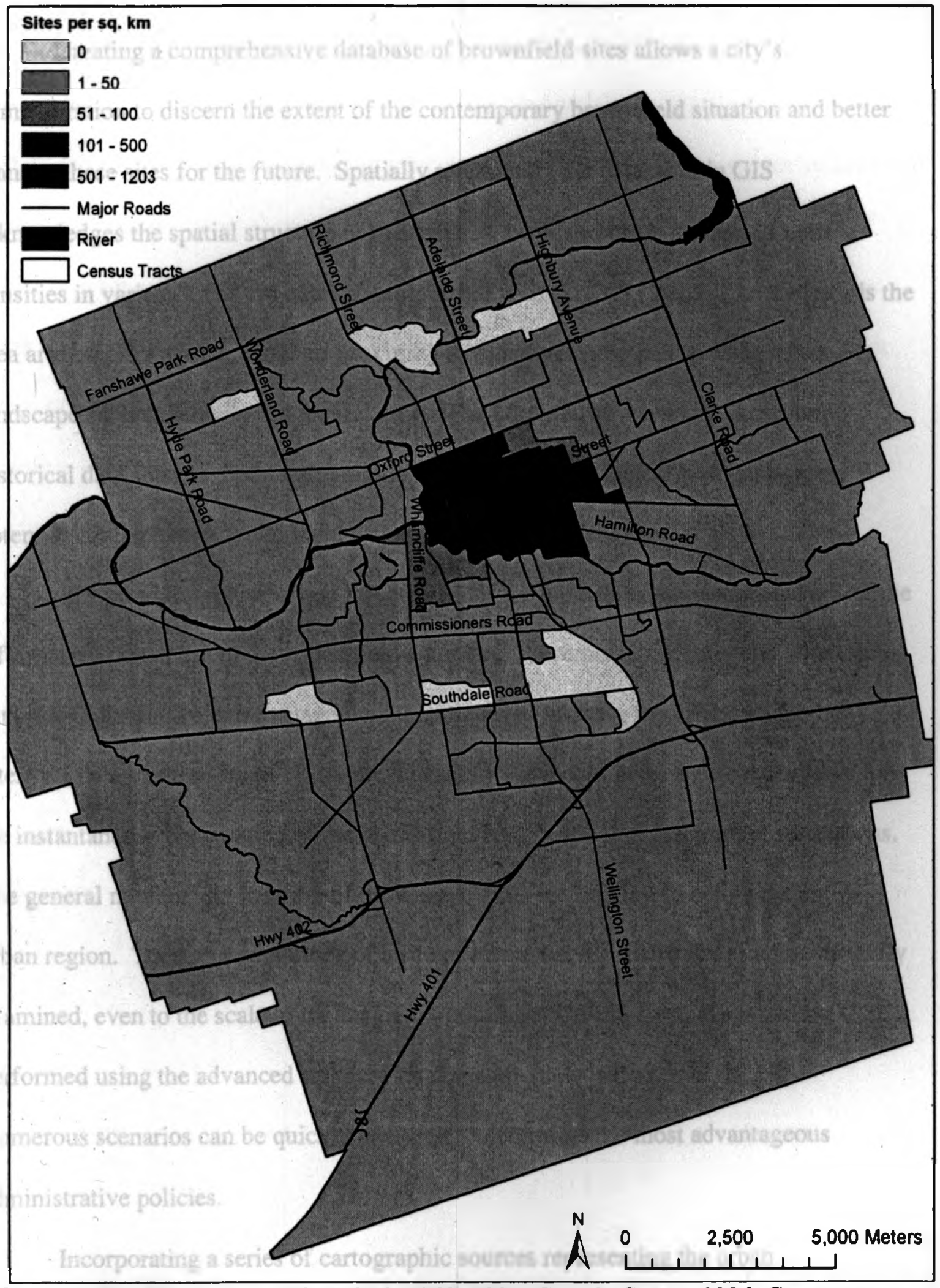
Figure 3.4 Location of Potentially Contaminated Sites, London, 1958

Source: City Directory, 1958. Sites represent directory entries for businesses which many have involved potentially hazardous activities. Please note every site does not necessarily qualify as a brownfield today.

Figure 3.5 Location of Potentially Contaminated Sites, London, 2001

Source: City Directory, 2001. Sites represent directory entries for businesses which many have involved potentially hazardous activities. Please note every site does not necessarily qualify as a brownfield today.

Figure 3.6 Density of Potential Brownfields by Census Tract, 1881, 1916, 1958, 2001



Source: City Directories, 1881, 1916, 1958, 2001. Canada Census 2006. Census tracts are shaded according to the density of former potentially contaminated land uses as listed in Table 3.2

3.5 Discussion and Conclusion

Creating a comprehensive database of brownfield sites allows a city's administration to discern the extent of the contemporary brownfield situation and better manage these sites for the future. Spatially referencing the databases in GIS acknowledges the spatial structure of this issue. Clusters of brownfields and their densities in various areas are quickly computable with the GIS. Also of importance is the area around brownfields and their proximity to sensitive components of the urban landscape such as schools and natural areas. The GIS platform can also incorporate historical data sources, both cartographic and tabular, to document past landscapes, potential contaminations, and the development of brownfield sites.

GIS provides powerful and effective tools for the management and analysis of the information pertaining to the brownfield situation. Piecemeal data entry and wholesale data manipulation are two management techniques to increase the efficiency in the intensive data creation stage. With the data entry stage complete, the system allows for the instantaneous observation of the brownfield issue through a spectrum of resolutions. The general number and location of brownfield sites can be viewed across the entire urban region. Then, the conditions of a site of interest at the micro scale can be instantly examined, even to the scale of the inside of buildings. On-the-fly analysis can be performed using the advanced standard- and spatial-statistical tools of the GIS. Numerous scenarios can be quickly analysed to determine the most advantageous administrative policies.

Incorporating a series of cartographic sources representing the urban environments through successive eras of development within the GIS allows for the

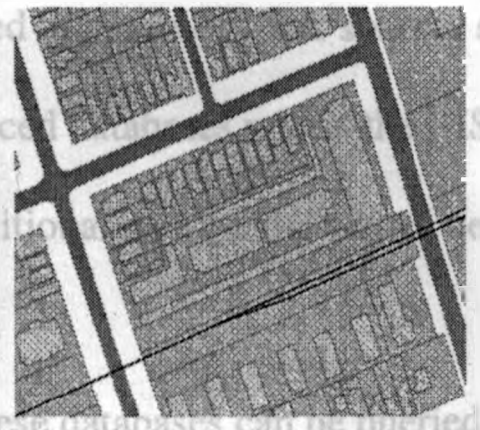
identification of industrial residues from past uses, as well as the tracing of a site as it changes over time (Figure 3.7). The fire insurance plans provide a detailed history of the site, indicating potential hazardous uses from the past which can remain contaminated today. This is not to say that every site is contaminated; however, it provides an excellent source to identify potential contamination for further investigation. Using a series of plans over time shows the addition or removal of hazardous uses. Following the sites over time also allows for the tracing of the redevelopment efforts (Figure 3.7). Rough dates of construction, as well as materials and layouts discerned from the plans add valuable information for the redevelopment process. This is especially acute in those instances when the site is deemed to have historical or architectural merit.

1923 Fire Insurance Plan

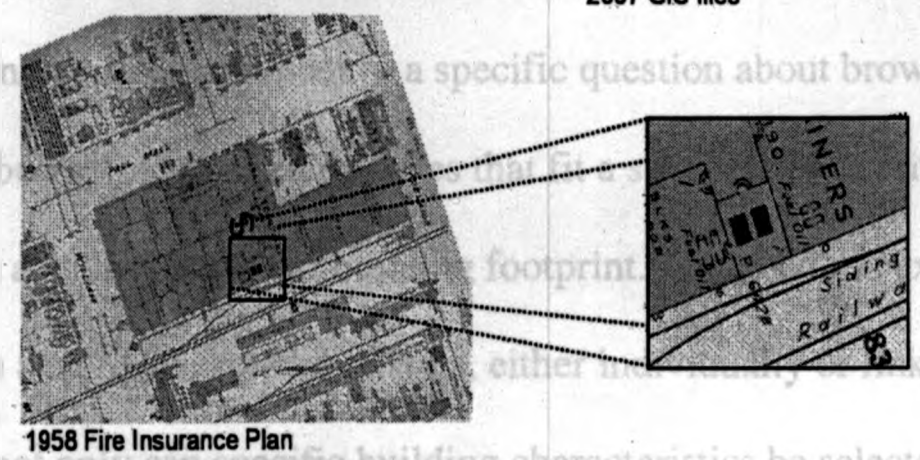
1913 Fire Insurance Plan

Figure 3.4 Tracing Changes through Time.

2007 Air Photo



2007 GIS files



1958 Fire Insurance Plan

1929 Fire Insurance Plan

1915 Fire Insurance Plan

Figure 3.2 By layering the fire insurance plans it is possible to determine the previous uses of a site. In 1915, this location was home to a scattering of residences alond the Canadian Pacific Railway, followed by industrial developments in 1929 and their expansion in 1958. A close up of the 1958 plan reveals possible contamination at this site from previous fuel oil tanks used on the site.

Drawing information from the overlaying and visual inspection of many cartographic sources is only one part of the system's potential. Information about the features on the maps, as well as that contained in a host of other sources such as the city directories, can be stored in spatially-referenced databases within the GIS. As new sources and resources become available, additional data can be added, demonstrating the expandability and adaptability of the system.

This information contained within these databases can be queried in order to isolate that information pertinent to a specific question about brownfields. Standard queries can be applied to draw out sites that fit a specific set of criteria such as date of construction and the size of the building footprint. Since GIS is explicitly spatial, the software can also handle spatial queries, either individually or linked with the standard type. Thus not only can specific building characteristics be selected for, but also their proximity to features of interest such as the limits of the central business district. For example, a query can be constructed to highlight all the gas stations within a one kilometre buffer of the river (Figure 3.8). In this example, as in many others, spatial considerations are important due to the proximity of hazards to sensitive areas.

Figure 3.5 Creating a Buffer zone of all Gas Stations in Proximity to Thames River

Figure 3.3 A 500m buffer is applied to the river using the analytical tools of GIS, allowing for potential hazards, such as gasoline service stations (shown as diamonds) to be isolated within sensitive areas. With a list of possible hazards, the fire insurance plans can be used to detail the specific site conditions.

The value of creating a GIS-based brownfield inventory is enhanced by its adaptability to other related issues. The system not only documents brownfield sites, but the general urban landscape, and can thus be used to manage a range of urban issues such as heritage inventories and engineering infrastructure. The fire insurance plans contain valuable information related to the development of the city's built forms. The adaptability of the system to other uses is enhanced by its expandability. When new data becomes available it can be added to the pre-existing GIS. If new cartographic sources are obtained, for example, they can be scanned and rectified. Statistical, nominal and photographic sources, both historical and contemporary, can also be incorporated as long as they contain a spatial reference in the dataset. Since the digitizing of information from the FIPs is such a large undertaking, it does not need to be completed at once; rather, as the information becomes needed it can be inputted. Since the system is not static, remediation efforts can also be tracked keeping the system up to date.

Despite its potential, building such a system does have several limitations that must be discussed. First, there are various levels of data availability for cities across North America and the United Kingdom and since this system is so heavily dependent on historical sources, it is possible that they are not available for some cities in certain periods. Second, even if sources are available, they require considerable labour to enter into digital format. This process has been aided recently by advances in automatically recognizing the text and figures using such tools as optical character recognition (OCR) of the nominal sources and auto-vectorization of the cartographic sources. Third, using GIS software requires skill, and for some it is a steep learning curve. A dedicated system administrator is likely needed with a number of technicians working under his or her

supervision. In general, building a GIS is not an easy task and the city must be cognisant of the costs of developing such a system.

The adaptability and expandability inherent in the digital architecture of the GIS allows for the easing of some of these disadvantages. The expandability of the system allows for it to be created in segments, wherein the most important pieces are created first, such as the digitization of the features pertinent to known brownfield sites, followed by the addition of other datasets as resources become available. The costs of the system can be spread across several projects since the system we have proposed is not only suitable for a brownfield inventory, but also to document the history and development of the city. Thus, it is adaptable for use in other city departments such as engineering, following the progression of the water system which is often portrayed on the plans, and historic preservation for documenting heritage properties and the successive eras of urban development. It is also possible to make the data contained within the system available to interested members of the general public, from individual property owners to genealogists. There are, however, ethical and legal issues to consider with making such valuable data publicly available. The presence of contamination on a site has the potential of instantly reducing a site's value on the real estate market. Public release of such information should only be done with great caution.

Now that most cities have built extensive GIS databases detailing their contemporary environments, I argue that they should focus their attention and resources on compiling historical data layers. Using available historical data sources such as the fire insurance plans and city directories, cities should expand upon their existing GIS systems by incorporating these high-quality, valuable records of past conditions. As I have shown

with this discussion on the brownfield issue, looking to the past helps to explain the contemporary situation and helps to produce informed regulations to guide future development. Building a comprehensive, spatially-referenced database of brownfield sites in GIS provides a valuable platform to manage these important sites. Although it is a time-consuming undertaking, it is also worthwhile one. In the next chapter I present an overview of brownfield regulations in Ontario and London.

Chapter 4: Policy Review

4.1 Introduction

The previous chapter outlined the need to create a database of brownfield sites to guide the development of effective policy aimed at promoting brownfield redevelopment. No studies have focused on a midsized Canadian city's experience with brownfield redevelopment or incentives aimed at promoting brownfield redevelopment. Thus, one of the main objectives of this thesis is to evaluate the effectiveness of London's brownfield policy in promoting redevelopment. So it follows that preceding the evaluation component of the thesis, a review and summary of London's brownfield policy must be presented. However before I delve into a review of London's Brownfield policy, I will first discuss the Province of Ontario's regulations regarding brownfield redevelopment. Brownfield redevelopment has received considerable attention at all levels of Canadian government as evidenced by the allocation of funds and the creation of a multitude of brownfield organizations such as the NRTEE, the Canadian Brownfield Network (CBN), and aboutRemediation.com

4.2 Brownfields Regulation in Ontario

The administration of brownfield redevelopment in Canada is chiefly the duty of the provincial, territorial and local governments, with local governments bearing most of the responsibility in terms of funding. Governments execute an approach whereby the redevelopment of brownfield sites is held to be the responsibility of the private sector, with governments playing primarily the role of facilitators (De Sousa, 2000). The Ontario

Provincial government does have guidelines for redevelopment as laid out in the Ontario Ministry of the Environment's (2004) *Record of Site Condition, Regulation*. This document outlines the conditions that property owners must meet in order to redevelop a brownfield site. The guideline informs all interested parties on the procedures required to evaluate the environmental condition of the property. Following the guideline will make the denial of development permits less likely, also increases the probability of gaining funding from banks, and decreases future liability risks (De Sousa, 2000). The *Record of Site Condition* (RSC) is a status report on the environmental condition of a property, based on the condition of the property and its intended use (Ministry of the Environment, 2004). The RSC describes the legislative and regulatory requirements for assessing the environmental condition of a site, the cleanup of brownfield sites and the filing of records of site condition. Its main purpose is to provide property owners, consultants, municipalities and all interested parties with the requirements that must be met in order to file a record of site condition. One of the most important aspects of the document is that it describes the provisions concerning protection from liability to property owners who have filed a record of site condition. If an RSA has been filed by a property owner then under the RSA they are protected under the law from future issues of liability. This is so because if a RSA has been filed then it proves that the property in question has met the applicable soil, ground water and sediment standards for the proposed property use. This protection is provided to promote the redevelopment of brownfield sites by removing the uncertainty associated with liability (Ministry of the Environment, 2004).

The Ministry of Municipal Affairs and Housing also developed a guide for redeveloping brownfields in Ontario: *A Practical Guide to Brownfield Redevelopment in Ontario.* This document was developed, largely, to help those interested in brownfield

redevelopment by providing a summary of the entire redevelopment process (Ministry of Municipal Affairs and Housing, 2007).

In Ontario, the province sets the environmental standards that must be met for remediation, as well as the assessment and processes required to demonstrate that a property is safe for redevelopment. Completing this process is mandatory before redevelopment can proceed; once this process is completed the property owner must then file a Record of Site Condition (RSC) (Ministry of the Environment, 2004). The investigation and remediation of a property is largely driven by property owners. If a property proposed for redevelopment is suspected to be contaminated based on past historical activities, a property owner should have an Environmental Site Assessment (ESA) completed. An ESA in the context of brownfield sites means the assessment of the environmental condition of the land including soil, ground water and sediment. An ESA may be carried out for purposes such as a sale of property between parties, to obtain financing or mortgage, or to obtain approval from a municipality for a land use change or building permit (Ministry of the Environment, 2004).

There are two types of environmental site assessment: A phase one environmental site assessment (Phase I ESA); and a phase two site assessment (Phase II ESA). In order to file a RSC, a Phase I must be completed, depending on the results of the Phase I, a Phase II may also be required. A phase I is conducted to determine the likelihood that one or more contaminants have affected all or part of the property. A Phase I must include a records review, a site visit, an evaluation of the information from these activities, the preparation of a written report and submission to the property owner. A phase I does not include sampling and analysis of the property (i.e. of the soil, ground water or sediment). A phase II is conducted to determine the location and concentration of one or more

contaminants in the natural environment. A phase II must include planning and conducting a site investigation the preparation of a written report, and soil, groundwater, and sediment sampling analysis (Ministry of the Environment, 2004).

In addition to the aforementioned, *The Brownfields Statute Law Amendment Act, 2001*, provides the provincial legislation that facilitates the redevelopment of brownfield sites in Ontario. Under the Act, clear rules were established which require mandatory filing of Records of Site Condition, certification standards for site clean-up professionals and limits on environmental liability for owners who follow prescribed procedures. The Act also provides municipalities with greater flexibility in designating community improvement areas for the clean-up and redevelopment of brownfield sites. This Act, amended several pieces of legislation to promote the redevelopment of brownfield sites by clarifying regulations on environmental liability to reduce the risks of redevelopment (Government of Ontario, 2001).

Ontario does not currently have a permanent funding program for assisting developers remediate brownfield sites, nor does it make available any formal financial incentives for attracting private investment to brownfields. This is the sole responsibility of the municipality. Municipalities play the lead role and are a key partner in the success of any brownfield redevelopment plan. However, property owners and developers interested in brownfield redevelopment face significant financing costs that may hinder redevelopment. Municipal financial incentive packages can help offset these costs and encourage property owners to engage in brownfield redevelopment.

In Ontario, many municipalities provide financial assistance to the private sector through a Community Improvement Plan (CIP). A CIP is an expression of a city's intention to facilitate revitalization, and may include financial incentives to help stimulate

investment and offset redevelopment costs. Financial incentives in the form of grants, loans or tax assistance are the most common forms of incentives available in any CIP. Tax assistance and grants are the most commonly offered incentives for remediation and redevelopment. It is the responsibility of each municipality to find the right mix of incentives that meet local needs. Ideally, any incentive program should be in place before interest arises from the private sector. Programs should be adequately funded, easy to understand, well-marketed and targeted to areas of greatest need. As interest in brownfields redevelopment grows in a community, it is important for a municipality to monitor the impact of their incentive programs. This can help ensure the incentives offered remain effective in encouraging redevelopment and help provide the rationale for continued support of the program.

The *Planning Act* provides the statutory framework for the development of community improvement plans in the Province of Ontario. Specific provisions in Section 28 of the Act provide that for the purpose of carrying out a community improvement plan municipalities may acquire, hold and sell land; and construct, repair, rehabilitate and dispose of buildings. They may also provide grants or loans to registered owners of lands and buildings within the community improvement project area, to pay for the whole or for any part of the cost of rehabilitating such lands and buildings in conformity with the community improvement plan (Government of Ontario, 1990).

4.3 An Overview of Brownfield Regulation in London

The origin of London's involvement with brownfield redevelopment arose out of a growing interest in sustainability, environmental concern, infill development and intensification [Mary, MPC, May 2009]. Its genesis was consistent with ongoing efforts

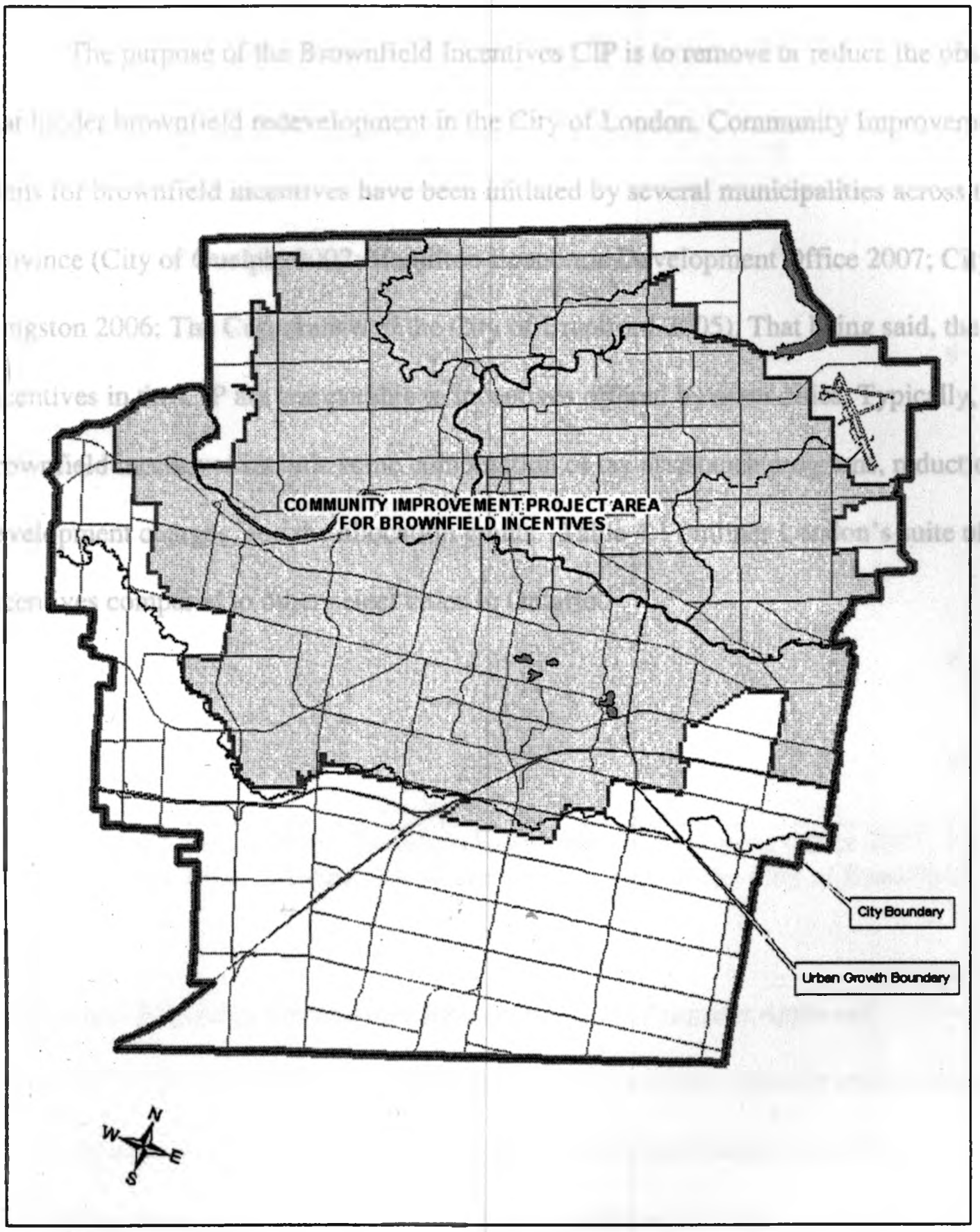
in Canada that cities need to manage growth more efficiently [Charles, SCP, March 2009]. The provincial government has long been an advocate of brownfield redevelopment and with the introduction of the *Record of Site Condition*, the issue had garnered much more attention and the City of London responded to this and followed suit by implementing policy aimed at promoting brownfield redevelopment [Bill, SCP, March 2009]

On January 23rd 2006, the Community Improvement Plan (CIP) for Brownfields Incentives was adopted at a Municipal council meeting at London City Hall. The City of London established this incentive package in order to encourage the cleanup and redevelopment of brownfield sites. The Brownfields Incentives CIP provides funding for brownfield redevelopment in the amount of $100,000 in 2006, $ 250,000 in 2007 and $500,000 per year from 2008 to 2010. Funding for the CIP comes from Federal Gas Tax Reserve Fund which is specifically designated for municipal incentives that promote improvements in the environment. The CIP provides a legal basis for the implementation of brownfield redevelopment incentives in London. One of the reasons the CIP was passed was that the City of London recognizes that in most brownfield sites public intervention is necessary to trigger redevelopment. The official approach to brownfield redevelopment in London is to consider the redevelopment of a site on a case-by-case basis to ensure they are both cost effective and in the public interest. The incentives proposed in the CIP are not to be considered aggressive, but represent a market based approach to brownfield redevelopment (City of London, 2006). The City of London claims that each project should be considered on its own merits to ensure that the benefits to the municipality are sufficient to justify the incentives being offered (City of London, 2006). The City of London's Brownfield CIP uses financial incentives to assist in

offsetting the cost of remediation in properties with real contamination. The City of London defines brownfields as "abandoned, vacant or underutilized lands and/or buildings within the urban growth boundary of the City of London (See Figure 4.1) where expansion, retrofit or redevelopment may be complicated by environmental contamination from past uses and development activity" (City of London, 2006, p. 6).

Source: City of London, 2006

Figure 4.1 Community Improvement Project Area and London Urban Growth Boundary.



Source: City of London, 2006

4.4 City of London Community Improvement Plan for Brownfield Incentives By-law Summary

The purpose of the Brownfield Incentives CIP is to remove or reduce the obstacles that hinder brownfield redevelopment in the City of London. Community Improvement Plans for brownfield incentives have been initiated by several municipalities across the Province (City of Guelph, 2002; Hamilton Economic Development Office 2007; City of Kingston 2006; The Corporation of the City of Brantford 2005). That being said, the incentives in the CIP are comparable to incentives offered by other cities. Typically, brownfield incentives include some combination of tax assistance programs, reductions in development charges, and the allocation grants. Table 4.1 outlines London's suite of incentives compared to other select cities in Ontario.

Table 4.1 Incentives offered by London and other Selected Cities in Ontario.

Program	London	Guelph	Brantford	Kingston	Hamilton
ESA Grant	●	●	●	●	●
Tax Increment Program	●	●	●	●	
Development Charge Rebate	●	●	●	●	●
Property Tax Assistance	●	●	●	●	●
Tax Arrears Cancellation		●			
Green Municipal Fund	●				
Municipal Acquisitions					●
Redevelopment Grant					●

Source: City of Guelph, 2002; Hamilton Economic Development Office 2007; City of Kingston 2006; City of London, 2006; The Corporation of the City of Brantford 2005.

4.4.1 General Eligibility Criteria and Requirements for Program Approval

The total amount of money spent by the City on brownfield redevelopment is fixed for each fiscal year and so applicants vying for approval must meet a number of requirements before they can apply for any of the incentives offered in the London CIP. The total amount of money awarded in any one case can be considerable. For example, a total expenditure of $567,095 was approved for one site in 2009. In light of the significant amount of money awarded, the eligibility criteria are extensive. In London, to be eligible

for any of the incentives offered in the CIP, an applicant must meet the following eligibility criteria:

- the landowner/applicant has not contributed to the site contamination;
- there are no outstanding property taxes, municipal orders or by-law infractions on the subject property;
- all relevant documentation and reports (i.e. ESA's, Remedial Action Plans, Risk Assessments) must be submitted to the City;
- financially supporting the proposal is considered to be both cost-effective for the City and in the public interest;
- the incentives are considered necessary to make the remediation and redevelopment on the subject property feasible;
- the amount of available and budgeted municipal funding is sufficient to cover the cumulative cost of all incentives that have been approved; and
- Municipal Council deems that the costs associated with providing the program incentives are outweighed by the cumulative benefits of providing the incentive(s).
- Properties eligible must be within the CIP Project Area, defined as the area located inside the Urban Growth Boundary.
- Applicants for the financial incentives must be the registered owners of the property.
- All outstanding work orders and/or requests shall be addressed to the satisfaction of the City of London prior to the disbursement of any financial incentives.
- Property owners shall comply with all relevant Provincial legislation

- Applicants shall provide the City of London with all required information, Environmental Site Assessment (ESA Phase I & II) reports and findings on the environmental condition of the subject property prior to receiving any financial incentives.
- A Record of Site Condition, certifying site remediation to appropriate contaminant levels according to Provincial criteria, must be submitted to the City and acknowledged by the Ministry of the Environment prior to commencing any development or redevelopment.
- All applicants shall enter into an agreement with the City of London, that will specify the terms, conditions and obligations of the applicant, and the City.
- The combined benefits provided under all grant, loan and property tax assistance programs proposed in the CIP, may not exceed the cost of rehabilitating the lands (City of London, 2006).

4.4.2 General Program Procedures

If an applicant is eligible for approval for any of the incentives, there are certain guidelines that both the applicant and the City must follow. The following program procedures apply to all the brownfield incentives in the CIP:

- All applications shall be submitted to the City of London, and shall include the following information:
    - name and address of the property owner and agent;
    - assessment roll number;
    - a plan showing existing development and land uses on the subject property;

- legal property description including easements, restrictive covenants, rights-of way and any other encumbrances or instruments registered on title;
- a statement confirming whether any environmental studies have previously been completed for the subject property;
- a description of the environmental study that is being conducted;
- cost estimate, name and qualifications of the consultant who will be conducting the environmental study;
- a description of any applications for development that are currently under review, or are being proposed for the subject property;

- Municipal staff will review the grant application and determine if it is complete. The application may be circulated to the Building Division, the Planning Division, the Finance & Administration Department, the City Solicitor's Office, the Heritage Planner and Environment & Engineering Services Department, for further assessment.
- Once all the documentation is in order, the review committee will submit a report to the Board of Control, together with the property owner agreement. The Board of Control will make a recommendation for approval or refusal of any incentive or combination of incentives to City Council.
- An agreement is executed between the City and the landowner outlining the terms and conditions of the approved incentives. If the landowner does not comply with all conditions of the agreement and other relevant municipal requirements, all financial incentives, assistance and grants provided under this program will be repaid to the City, with interest.

- The applicant provides the City with copies of all relevant environmental reports, proposals and estimates for the work to be undertaken (City of London, 2006)

4.4.3 Contamination Assessment Study Grant: Program Description

The city of London acknowledges that the lack of information on the existence, type, extent and location of site contamination is a key barrier to the redevelopment of brownfield sites. In order to combat this, one of the incentives offered is a *Contamination Assessment Grant*. This program is designed to stimulate redevelopment by providing information on the extent of contamination that may be present, as well as outlining the extent of the costs necessary for remediation. This information will provide potential investors and the City with accurate information on remediation costs, associated risks and development potential. Contamination Assessment Grants will be provided to the owners of eligible properties with real or suspected contamination, to conduct Phase II Environmental Site Assessments. The amount of the study grants will be 50% of the cost of the environmental study, up to a maximum of $10,000 per property. Contamination assessment study grants will only be offered to eligible properties where there is evidence of contamination confirmed through a Phase I ESA (conducted at the expense of the property owner) (City of London, 2006). When compared to other cities in Ontario, London has the highest annual operating budget but the amount of the grant per property is relatively the same at $10,000 with the exception of Hamilton (Table 4.2)

Table 4.2 Dollar Amount Provided by London for CSA Compared to Selected Cities in Ontario

City	Provides Grants for Phase II ESA	% up to $	Annual Operating Fund $
London	Yes	50% up to 10,000	500,000
Guelph	Yes	50% up to 10.000	200,000
Brantford	Yes	50% up to 10.000	100,000
Kingston	Yes	50% up to 10.000	195,000
Hamilton	Yes	50% up to 20.000	-

Source: City of Guelph, 2002; Hamilton Economic Development Office 2007; City of Kingston 2006; The Corporation of the City of Brantford 2005.

4.4.4 Property Tax Assistance: Program Description

This program allows the City of London to provide tax assistance to an eligible property in the form of a freeze or cancellation of part or all of the property taxes levied on that property. This *Tax Assistance Program* provides tax relief to property owners through the cancellation of 25% of current property taxes for up to three 3 years during which rehabilitation and development activity is taking place. Since the amount of tax assistance can be significant, a business case assessment is required for each application to evaluate the need for assistance, expected public benefits and required public expenditures. Applications may be approved or denied on the basis of the business case assessment and the availability of funding. In addition tax assistance will only be offered to eligible properties where there is a potential for rehabilitation. If a property owner defaults on the loan or breaks any of the agreement requirements, the property owner becomes liable for full repayment with interest of the municipal property tax assistance granted during the rehabilitation and development periods for the (City of London, 2006).

This program is unique to the rest of the incentives in the CIP in that it is the only incentive that, if eligible, incorporates provincial funding. For properties that meet the eligibility criteria, the Minister of Finance may match the municipal contribution with a portion of education property tax assistance subject to the availability of provincial funding. However, municipalities must submit a separate application the Ministry of Finance for approval to be eligible for matching Provincial education property tax assistance. The education property tax assistance component would be provided for a maximum period of three years subject to the availability of funds. If a property is eligible to receive this incentive the City will prepare a draft bylaw and submit it as part of the application form for matching education property tax assistance. The Education component of this tax assistance program is solely the responsibility of the Provincial Government (City of London, 2006).

4.4.5 Development Charge Rebate: Program Description

The London CIP also offers a development charge rebate that may provide an incentive to the owners after site remediation has been undertaken and prior to the commencement of development. This financial benefit is intended to lower upfront development costs and encourage investment by landowners. *The Development Charge Rebate Program* would provide a grant back to the property owner for up to 50% of the normal development charge to cover eligible remediation costs. The development charge rebate grant becomes liable for payment in full, with interest, in cases where the property owner defaults on by-law or agreement requirements (City of London, 2006).

4.4.6 Tax Increment Equivalent Grant: Program Description

The tax increment program is intended to make redevelopment more economically feasible. This program reimburses part of the municipal portion of tax increases for a new development on vacant or underutilized sites. The amount of the tax increment equivalent grant is equal to the increase between the predevelopment and post-development municipal portion of property taxes after rehabilitation and development has taken place. Where improvements have been approved by the City, resulting in an increased assessed value of the property and therefore increased taxes, the City will provide a grant equal to the amount of the municipal property tax increase as a result of the rehabilitation and development for up to a maximum of three years from the date of the increase in assessed value. As with the other incentive programs that are offered under this CIP, the combined benefits provided under all grant, loan and property tax assistance programs proposed in this plan or any other CIP, may not exceed the cost of remediation. As enticing as this incentive may be, it does not include any costs for which grants have been provided under the *Contamination Assessment Study Grant Program.* Further, tax increment grants become liable for payment in full, with interest, in cases where the landowner defaults on the by-law or agreement requirements. The annual grant will be constant each year but may be adjusted in the final year, if necessary, so that the total amount of financial benefits issued under this CIP program does not exceed the total amount of eligible remediation costs (City of London, 2006).

4.4.7 Green Municipal Fund Program: Program Description

The City of London expects that in some instances applications will be made for financial assistance. The source of the finances for these types of applications will come

from the *Green Municipal Fund (GMF)* which is a source of financing for municipal environmental projects. The types of projects this fund will support include environmental developments in the categories of Energy, Waste, Water, Sustainable Transportation, Integrated Community Planning and Brownfield Remediation. The GMF program is oriented to larger projects that may require extraordinary funding (i.e. above and beyond the financial assistance that may be available through the City's CIP). Applications are completed on a project-by-project basis. The amount of funding that will be provided will depend upon the project's potential for public benefit. That is, it must have environmental benefits and must be economically justified (City of London, 2006).

4.5 Conclusion

This chapter has outlined brownfield regulation in Ontario. It has also summarized brownfield regulation in London. In addition, it has presented an explanation of the specific financial incentives provided in London's CIP. The following chapter details the methods employed in interview component of this thesis as well as presents the results of the interview analysis.

Chapter 5: Interview Analysis

5.1 Introduction

This chapter aims to analyse the balance of forces governing the issue of brownfield redevelopment in the hope of identifying what, if any, barriers exist in London that may hinder the success of brownfield redevelopment in London. The main objective of this chapter is to highlight the obstacles involved in remediating brownfield sites as well as to gauge the effectiveness of London's brownfield incentives. In the next section, I review the literature as it pertains to brownfield redevelopment and policy. This will be followed by a presentation of the methods employed in the study. I then go on to report the results of the interview analysis.

5.2 Literature Review - Brownfields and Policy

Studies analyzing the role of policy and regulation in brownfield redevelopment represent the bulk of the academic research conducted in the brownfield literature. Most of these studies have focused on site specific case studies that involve a particular locale's experience with various economic incentives aimed at promoting successful redevelopment, barriers to private-sector barrier remediation, and issues of liability (Adams et al., 2000; Alberini, et al., 2005; De Sousa, 2000; McCarthy, 2002; Wernstedt et al, 2006). These types of studies examine the progress of policy (McCarthy, 2002), effectiveness of fiscal measures aimed at promoting brownfield redevelopment (Adams et al., 2000; Alberini et al., 2005; Wernstedt et al, 2006), the nature of economic costs and risks involved in brownfield redevelopment (De Sousa, 2000), and the role of government

intervention (De Sousa, 2005). The information derived from these papers comes from case studies, interviews, surveys and policy analyses. All focused their efforts on case studies in the US, with the exception of De Sousa (2000) who examined the Canadian experience as a whole but did not focus his efforts on one midsized Canadian city such as London.

The studies surveyed in this section revealed that there are four major themes in these types of studies: 1) Obstacles to redevelopment; 2) Reducing obstacles to redevelopment; 3) the role of government intervention; and 4) collaborative approaches to promoting brownfield redevelopment.

From McCarthy's (2002) analysis, concern about legal liability for contamination is considered the greatest impediment to brownfield reuse. Alberini et al. (2005) and Herbele & Werstedt (2006) are in agreement and found that developers place a high premium on liability relief. De Sousa (2005) discovered that the relatively slow procedural process involved is a major hurdle to redevelopment. McCarthy (2002) adds that this is a result of a lack of clear guidelines regarding site assessment costs and that extended development periods that arise from this deter redevelopment prospects. It can be said that most sites remain idle because the municipalities traditionally focus their attention on the most contaminated sites and so redevelopment of the less polluted ones is stalled (McCarthy, 2002).

However, Adams et al (2000) disagree and claim that because redevelopment costs are in excess of the predicted value of the completed brownfield site, such places can remain idle for considerable periods of time. De Sousa (2000) found that brownfield redevelopment is indeed perceived as being less cost- effective and entailing greater risks than greenfield redevelopment by developers. This is a discouraging notion given that

Herbele & Wernstedt (2006) found that economic benefits accrued from brownfield redevelopments are the major propeller of investment. With these obstacles to redevelopment in mind, Herbele & Wersntadt (2006) note that many basic real estate fundamentals such as site location, size, building characteristics, construction costs and access to a skilled labour force are often a more important set of obstacles to redevelopment than any of those previously mentioned.

In addition to detailing the obstacles to redevelopment, the literature also poses methods aimed at reducing the various barriers. Government efforts to reduce the barriers to private brownfield redevelopment have focused on making redevelopment easier for the private sector through legislation and policy changes (McCarthy, 2002). Adams et al (2000) assert that fiscal measures such as grants and subsidies are effective means of mobilizing redevelopment schemes. However, De Sousa (2000) opposes this view and states that not enough is being done by policy makers to stimulate redevelopment through the implementation of cost and risk reduction measures (De Sousa, 2000). Wernstedt et al. (2006) agree and suggest that liability relief in the form of environmental insurance may heighten investment as developers will be more willing to invest due to the fact that they are protected from future complications arising from contamination that may have been missed in the cleanup process. Nevertheless, Alberini et al. (2005) found that developers are not deterred by prior contamination, once it has been cleaned up, and appreciate the speedy review of development and remediation plans, direct financial incentives and flexible cleanup standards. This suggests that these are acceptable policy tools that can be used to influence land use. Another solution for the brownfield problem would be to make it easier to rezone industrial sites to more profitable land uses such as residential or commercial (De Sousa, 2000). Alberini et al. (2005) found that developers

with no experience in brownfield redevelopment are reluctant to invest in such projects and so attracting a wider range of new, inexperienced developers will require campaigns aimed at education and marketability. On a more general level, assertions and misunderstandings associated with brownfield redevelopment need to be reassessed for policymakers to succeed in increasing reuse (Wernstedt et al., 2006).

Adams et al., (2000), claim that private brownfield redevelopment is dependent on the political agendas of the public sector and without public sector support redevelopment would simply not take place. However, government regulation may actually impede redevelopment because complying with government procedures may limit the opportunities for profit (McCarthy, 2002). Because the financial input comes mostly from the private sector, De Sousa (2005) asks whether the government should remove itself completely from the picture or else become involved in the process even more directly.

Successful brownfield redevelopments often require financial assistance from public agencies. The risks of redeveloping contaminated sites and the extraordinary costs associated with investigating and cleaning up such sites make public financial assistance essential for moving many brownfield redevelopments forward. Alberini et al. (2005) claim that developers with experience in redeveloping brownfield sites are more likely to take advantage of subsidies than those with no experience, which suggests that subsidies may be a relatively inefficient way of soliciting cleanup and redevelopment at locales where virtually all prospective developers have not engaged in brownfield projects before. The reason being that those with experience find the redevelopment process less daunting because they have previously engaged in brownfield redevelopment and are fully aware of the problems that arise during redevelopment. The public and private sector claim that the most effective form of government intervention for encouraging

brownfield redevelopment are policies related to the provision of project grants and other financial incentives. They see the implementation of vacant land taxes and maintenance costs as deterrents to redevelopment since these properties generate no income. Such taxes assume there is a sufficient supply of brownfield land available (Adams et al., 2000; De Sousa, 2005). One final and important theme identified from the literature is that most of the interviewees in De Sousa's (2005) study indicated that local governments were the most important level of government in facilitating redevelopment.

Efforts to promote brownfield redevelopment transcend the boundaries of different jurisdictions within a metropolitan region. Consequently, an integrated, contextual and collaborative approach is necessary for successful brownfield redevelopment because it touches on a number of issues involving the social costs and benefits of brownfield redevelopment that relate to community concerns, environmental justice and regional land use and environmental quality (McCarthy, 2002). Solving the brownfield problem requires a concerted effort among developers, landowners, environmentalists, governmental players and the public (De Sousa, 2000). However, Herbele & Wernstedt (2006) caution against the involvement of the public in that it can be particularly problematic, since the public's opinion can severely restrict development due to such phenomena as NIMBYism. To combat this, the establishment of local brownfield redevelopment authorities could be organized. A single point of authority that acts as a mediator between all stakeholders involved could prove to be an invaluable resource (McCarthy, 2002). However, the successful redevelopment and acceptance of brownfields may require that practitioners move beyond a property-by-property approach and place brownfields into a large scale endeavour that seeks to revitalize multiple properties across entire regions (Herbele & Wernstedt, 2006).

5.3 Methods

5.3.1 Qualitative Methods

In order to address the second and third research objectives stated in Chapter 1, a qualitative analysis in the form of interviews was employed. Qualitative methods explore feelings, understandings and knowledge through interviews, discussions or participant observations. These methods are increasingly used by geographers to explore some of the complexities of human relationships in order to gain a deeper insight into the processes shaping our social worlds. In qualitative studies, local case-specific knowledge is given prominence over grand theory (Dwyer & Limb, 2001). This approach made it possible to gather appropriate information on the perceptions of those directly involved in brownfield redevelopment and on the implications of various brownfield redevelopment polices. Interviews can be regarded as a common method used by social researchers to gather meaning and gain a deeper understanding of a particular topic (Esterberg, 2001). The interview is a powerful qualitative research tool, when the focus of inquiry is narrow and the interviewees represent a bounded group within a specific context (Dwyer & Limb, 2001).

5.3.2 Rationale

Interviews were chosen because they can provide additional insights into the effectiveness of the policy instruments outlined in the policy analysis chapter of this thesis (Chapter 4). Further, the interviews are only concerned with the perception, opinions and perspectives of city officials and private stakeholders because city officials are the originators of the policy and so they have a depth of knowledge on the subject matter. The private sector are the beneficiaries of the policy that originates from the city

officials; it is their experience and understanding of policy that will drive the redevelopment of brownfield sites and so their perspectives are equally important to this study. Policy makers, developers and interest groups involved in urban development were asked a series of open ended questions during semi-structured interviews aimed at obtaining information regarding their opinions and perceptions as they relate to issues surrounding urban brownfield redevelopment initiatives. The interviews were based on the perspectives of both the private and public sectors with a vested interest in brownfield redevelopment in London, Ontario. The interviews were focused on obtaining information from the participants' perspectives as they relate to government policy and legislation on brownfield redevelopment.

5.3.3 Participant Selection

I employed the use of purposive sampling in my participant recruitment to intentionally target and include interviewees for their specific perspectives. The criteria used for selecting the interviewees include participation or in-depth knowledge of brownfield-oriented projects in London, and involvement in brownfield redevelopment projects. In total fifteen (15) interviews were conducted. Although a sample size of 15 might be considered relatively small, those interviewed for the present study represented key stakeholders involved in brownfield redevelopment in London. The small sample size can be further justified by the fact that the London brownfield CIP is only three years old and thus experience with the incentives and brownfield redevelopment in London is fairly limited.

The interviews were designed to gauge the experiences of those involved with brownfield redevelopment in London. At an initial meeting with a City of London planner

involved with brownfield redevelopment, a list of private developers with experience in the field was provided by the planner. In total, eleven names or companies were provided. All were contacted via email. The email explained the purpose of the study as well as an invitation to participate. Of the eleven, only five private developers were willing to participate, the remaining either declined or did not respond to the email. Of those that did not respond, a follow up email was sent but still no response was received.

If a site has been remediated, by law, the owner of the property is required to file record of site condition (RSC) with the Ministry of Environment. This Registry is available online at the Ministry of Environment's website. From this registry, I was able to extract six properties as well as the name of the owner and their contact information. All six potential participants were contacted, however only one land owner was willing to participate. The remaining five either declined to participate or did not respond.

Prior to the London Brownfield CIP being approved, copies of the report were sent out to fourteen municipal departments, advisory committees and various interest groups for public consultation. This list of agencies can be found in the internal circulation copy of the London Brownfield CIP. All fourteen of these agencies were contacted via email. Only three agencies were willing to participate, the remaining eight either declined or did not respond to the emails.

All members of the, 2006 and 2009 City's planning committees were contacted for participation in this study. Members of the 2006 planning committee were contacted because this was the year in which the brownfields CIP was passed. Members of the 2009 planning committee were contacted as well because I wanted to investigate how much of a priority brownfield redevelopment was given on the current planning agenda. In total, twelve potential interviews were contacted via email. None of the members of the 2006

planning committee responded. However, two of the six members of the 2009 planning committee were willing to participate. In addition, four senior planners involved with brownfield redevelopment were contacted. All four participated in the interviews.

5.3.4 The Interviews

A total of 15 personal interviews were conducted over a 12 month period with key stakeholders with a vested interest in brownfield redevelopment in London: Two developers, two representatives of one consulting firm specifically aimed at brownfield redevelopment, one environmental clean-up agency, two economic development organizations, one non-profit interest group, one land holder and six city officials directly involved with brownfield redevelopment in London. Each interview lasted approximately thirty minutes to an hour. Interviews were held at the location of the respondent's choosing. A letter of information explaining the purpose of the study was presented to participants at the onset of the interview (Appendix A). Participants were asked to read the letter of information, and invited to ask for clarification on any items they did not understand. After reading this, participants were asked to sign a consent form, and any remaining questions or concerns were addressed. All participants signed the letter of consent. Participants were then asked verbally if they permitted me to record the interview. All participants agreed, and all interviews were digitally recorded with verbal consent. The interview guide can be seen in Appendixes B and C.

The interviewees could be divided into two groups: City officials and private sector participants. Each group was asked a separate set of slightly different yet similar questions. City officials were asked 20 questions and private stakeholders developers were asked thirty. Each set of questions were divided into eight general areas: (1) Their

experience with brownfield redevelopment; (2) their experience with London's brownfield redevelopment incentives; (3) how they perceived the effectiveness of London's brownfield redevelopment incentives; (4) their motivating factors for getting involved in brownfield redevelopment; (5) what benefits they perceived from brownfield redevelopment; (6) obstacles and barriers to brownfield redevelopment in London; (7) the role of governmental and non-governmental stakeholders in facilitating brownfield redevelopment; and (8) their estimates of the amount of brownfields in London.

5.3.5 Data Analysis

Throughout the course of this interview process, I had to ensure that the data collection was administered with consistence and rigor. To do this I employed a note taking technique both during and after the interview. During the interview I noted observations that included the respondent's demeanour, attitude, willingness to converse, openness, and hesitations. Directly following the interview I noted any problems with the process of the interview itself. These notes included questions that might require further probing, the re-phrasing, addition or removal of certain questions. Following the interview phase of the research, each interview was transcribed verbatim into electronic format. Each hour of audio entailed roughly eight hours of time for transcription, error and accuracy checking. I transcribed all fifteen interviews. The transcription process was time consuming and at times tedious, however it allowed me to become much more familiar with the data.

In the data analysis phase of the research I applied principles of grounded theory to my investigation. In a grounded approach the researcher needs to be clear in reporting

research procedures so that the results may be evaluated in terms of the validity of the data and the competence of the research process (Knigge & Cope, 2006).

The purpose of grounded theory is to build theories from data about the social world such that theories are grounded in people's everyday experiences and actions (Knigge & Cope, 2006). It is general methodology of analysis linked with data collection that uses a systematically applied set of methods to generate an inductive theory about a substantive area (Fendt & Sachs, 2007). According to Charmaz (2004), grounded theory methods are a "logically consistent set of data collection and analytic procedures" (p. 496) aimed at developing theory. A fundamental characteristic of grounded theory methods is that they unite the research process with the theoretical development by constantly oscillating back and forth between the data collection and data analysis phases of research (Charmaz, 2004).

My primary tool for data analysis was Microsoft Word Processor. I began the interview analysis by reading and re-reading the interview transcripts. This process of familiarizing myself with data led to the development of a substantial number of codes. I then proceeded to code the interview transcripts line-by-line, quote-by-quote and concept-by-concept. Using Microsoft Word Processor, I coded the interview transcripts by inserting comments in the margins. The first major analytic phase of the research consists of coding the data. Coding leads directly to developing theoretical categories. Initial coding is done by examining each line of data (from verbatim transcriptions) and defining the actions or events that you see occurring in it (Charmaz, 2004). Initial codes help the researcher break the data into categories and begin to see processes. In this way, data collection becomes more focused. Coding is also a method of evaluating and organizing data in an effort to understand meanings in the text (Knigge & Cope, 2006). However,

this initial round of coding led to a significant number of codes which made it difficult to categorize the codes and capture the broader concepts that were emerging from the data. As a result, I proceeded to administer a second round of coding. Charmaz (2004) refers to this process as "focused coding" (p.508). Here, earlier codes that continually emerged in the initial round of coding were used to sift through the data once more. This method of analysis is less open-ended and more targeted than open-coding. In this way I was able to create broader categories to organize and capture the themes that were emerging in the data. This process allowed me to incorporate codes and themes that I deemed to have overriding significance in explaining the processes occurring in the data.

The next step in the analysis involved creating a separate Word file for each category, and in each file I copied and pasted quotes from the transcripts that I believed represented the category in which that quote was placed. This allowed me to work with the specific categories which led to the memo-writing phase of the analysis. Memo-writing is the intermediate step between coding and the first draft of the completed analysis. Memo-writing helps the researcher elaborate on concepts and assumptions subsumed in the coding. It allows the researcher to dig into implicit meanings and frees the researcher to explore his or her ideas about the categories (Charmaz, 2004). Here I allowed myself to explore and compare respondents' beliefs, opinions and perceptions with one another and used the respondents' quotes to illustrate points I was trying to establish. Under each quote, I wrote what I considered the significance of that quote and how it was related to its respective category. This allowed me to explore my ideas about the categories and to direct the shape of the results and first draft of the completed analysis. In the next section of this chapter, I present the results of the interview analysis.

5.4. Results

This section presents the findings from interview analysis of this study. Results are organized by the themes which emerged from the interviews. Each section includes quotes from several participants, however, I do not identify the participants with their actual names in order to maintain confidentiality within this relatively small group of subjects. Also, due to the sensitive nature of topic, confidentiality must be strictly guarded. Various interest groups are represented by the following abbreviations: SCP = Senior City Planner; PD = Private Developer; PO = Property Owner; MPC = Member of Planning Committee; ECA = Environmental Cleanup Agency; EDO = Economic Development Organization; and NPIG = Non-Profit Interest Group.

5.4.1 Importance of Brownfield Redevelopment on London's Policy Agenda

During the interviews, city officials were asked to comment on how high of a priority brownfield redevelopment was given on the City's policy agenda. The findings suggest that brownfield redevelopment alone is not given priority status on the City's policy agenda. According to Mary, a member of the planning committee, brownfield redevelopment is not a priority on the City's policy agenda. In Mary's opinion, London is lagging behind other cities in terms of being leaders in brownfield redevelopment. Furthermore, there is a growing concern for brownfield redevelopment, thus the adoption of the brownfield CIP:

> In the scheme of urban growth management, probably not as high on the agenda. I'd say that we're lagging other municipalities but in terms of our policy our staff have worked hard to change the official plan policies... last year [the] Ministry of Municipal Affairs and Housing...they've done a lot to try and incent [and] move the industry along to try and develop brownfields [Mary, MPC, May 2009].

Another respondent claimed that brownfield redevelopment is not given a high priority in terms of London's policy on urban growth management. However, Liz did acknowledge that the current planning council has shifted its focus to urban growth management and brownfield redevelopment can be considered a viable way to manage urban growth:

> I don't think it's on the top of the mind of everybody but the fact that council's approved the incentive programs. I think it means that they're quite serious about it. It's not like everyone is running around talking about it all the time, but there's a pretty good plan in place. This council has been seen to be a bit more, less urban sprawl, more green, so that means that it was a pretty important issue [Liz, MPC, March 2009].

Another participant at City Hall claims that inner city revitalization is high on the city's policy agenda. Infill development and intensification are considered priorities on the city's policy agenda. Since brownfield redevelopment can be considered a subset or application of these priorities then in this light brownfield redevelopment can be considered a priority. However, brownfield redevelopment alone is not considered a priority but is consistent with the prevailing planning principles of the city's administration:

> It is consistent with the ongoing efforts that cities had to promote revitalization and redevelopment in all kinds of areas. Brownfields just became one of the more recent types of redevelopment projects. It's even gaining more of an interest now because a lot of brownfield sites are inner city sites so, given the emerging desire that we build more on existing infrastructure, look at intensification, landfill opportunities, brownfield sites that were formally not used for residential purposes are now becoming more viable for residential purposes ... its completely consistent with where the thinking is now going [Charles, SCP, March 2009].

Bill, a senior city planner, commented that there are only a small number of brownfields in London and as a result the issue is not high on the policy agenda. However, Bill acknowledged that making use of existing infrastructure, curbing urban sprawl, and intensified and sustainable growth are all high on the policy agenda, but London's brownfield stock is not large enough to tackle these issues:

> London doesn't have as many prominent brownfield sites maybe as some other communities might, for example, Hamilton. But we do have some and because brownfield sites are located where services are already provided, it's a real waste to see those lands sitting idled or underutilized. If you can redevelop those sites, you're making better use of existing infrastructure, you're growing in a way that's more compact, more intense as opposed to relying strictly on greenfield developments for growth [Bill, SCP, March 2009].

London's official plan supports intensification, compact growth and curbing of sprawl. Because these objectives are high on the agenda, brownfield redevelopment can help meet these objectives. Eric, also a senior city planner, expressed that brownfield redevelopment can be considered high on the policy agenda:

> We have policies in the official plan that support intensification and redevelopment of existing inner city sites and there have been some new policies that support the brownfield redevelopment program. It's just more so in recent years that we've taken a more active policy role in terms of supporting brownfield redevelopment. We're trying to limit the amount of sprawl that's occurring and one of the ways we can do that is trying to redevelop inner city sites that might have had some previous industrial or commercial uses... there's actually several objectives that we'll meet by encouraging redevelopment of brownfields [Eric, SCP, February 2009].

The results indicate that brownfield redevelopment is not a priority on the City's policy agenda but is an important tool in contributing to urban growth management.

5.4.2 Benefits of Brownfield Redevelopment

The interviewees were asked to comment on what they perceived to be the most important benefits of brownfield redevelopment. There was unanimous agreement among all the participants that brownfield redevelopment has the potential to generate several environmental, social and economic benefits.

In the comment below, a participant mentioned that one of the benefits was generating tax revenues for the city. By putting an underutilized site back into productive use, the property taxes of that property increase, thus generating tax dollars for the City:

> I think it's a combination; it's from an environmental perspective. It reduces contamination and encourages remediation, and improves the quality of life. It also encourages the use of vacant or underutilized sites in the city which generates tax revenue and is a good, efficient use of land [Eric, SCP, February 2009].

In addition to generating tax revenue, most of the respondents commented that brownfield redevelopment has the added benefit of making use of existing services and infrastructure:

> The other thing that we needed to really communicate is that there's great benefit to the municipality, financially, of taking advantage of existing municipal services, whether it's the snow plow and garbage pick up or the transit. These services are being run through areas where the brownfields exist; let's get tax revenues out of these properties [Mary, MPC, May 2009].

As indicated in the quote below, a major benefit of brownfield redevelopment is putting underutilized land back into the land inventory which will provide alternative options to greenfield redevelopment:

> I think that one of the biggest benefits is that it brings what would otherwise be undevelopable sites into our inventory of developable sites. So, it certainly says we do actually have a land base to provide for redevelopment and revitalization. I think that is one of the biggest benefits [Charles, SCP, March 2009].

Another participant stressed the importance of making use of existing infrastructure and the need to grow in a compact fashion rather than sprawl. Bill also noted that brownfield redevelopment fills in the gaps in the urban fabric and contributes to environmental cleanliness:

> It's a really good situation where you're achieving multiple objectives, you're developing a brownfield, you're encouraging residential intensification... its just making a good use of land that's already in the urban fabric of the city, so you're making productive use of land that's already serviced, you're filling in gaps that exist within your urban landscape and you're cleaning up environmental contaminants [Bill, SCP, March 2009].

Benefits of brownfield redevelopment, such as generating tax revenues, fostering neighbourhood revitalization, infill development, making use of existing infrastructure,

and providing alternatives to greenfield development were frequently mentioned by many of the participants:

> The redevelopment of these sites generates tax revenues. It can foster neighbourhood revitalization; it's consistent with council's desire that we provide opportunities for revitalization. It provides an alternative to greenfield development and it builds upon existing infrastructures [Charles, SCP, March 2009].

Similarly, in the comment below, Steve mentioned that making use of existing infrastructure, using brownfields as alternatives to greenfield redevelopment, infill development, and intensification are all benefits of brownfield redevelopment:

> From my perspective it's an opportunity to make use of something that's already there so that greenfields don't have to be developed. And for all the reasons about maintaining intensification inside the core and the fact that these properties are already serviced and making something good out of something bad is appealing and is desirable and I think it's a goal we should all share [Steve, NPIG, February 2009].

One respondent discussed that brownfield redevelopment has environmental benefits and also provides opportunities to revitalize an area. There is an economic benefit to brownfield redevelopment and this has a multiplier effect which attracts more investment into an area:

> It makes the city a better place because a lot of these areas I find are close to downtown so, if you start having idle properties it just could break down the use of that area because its starts looking rundown because these areas when they're left like that they just look horrible whereas that could be a booming business which helps the economy. I think it's just this cycle and people would want to then move into those areas, put in more commercial [Linda, PD, ECA, February 2009].

Another participant discussed at length how brownfield redevelopment has the benefit of revitalizing the downtown core of a city, and that this revitalization has a ripple effect of attracting more investment, ultimately creating a more vibrant community:

> One is that it makes for a more vibrant community, particularly our downtown area. I think just having a strong city core is important. The second part of that is

> really that it does continue to breed more growth. If you can develop a block where you got good opportunity there, if you can get those first two or three stakeholders in that block then you got another restaurant that will come in and make another focused retailer and so then what you can do is you can continue that development that you end up cleaning up that whole area, you end up revitalizing that whole [Paul, EDO, February, 2009].

A key point that emerged from the interviews was that all the participants are aware of and appreciate the potential benefits that can result from brownfield redevelopment.

5.4.3 Barriers to Brownfield Redevelopment in London

The interview discussions revealed a number of significant barriers to brownfield redevelopment. In general, the public's perception of brownfields, risk, cost, liability and the remediation process were the most significant barriers. One of the main barriers to the success of the London CIP is public perception of brownfield redevelopment:

> Part of it is public perception about brownfield sites, there's a real hesitancy among the developers to get involved in the sites because there have been some past problems with certain brownfields and there is a reluctance on the side of developers to get too involved because they fear problems that might arise both from an environmental perspective and also liability [Eric, SCP, February 2009].

Similarly, in the comment below Tom discussed that in order for brownfield redevelopment to be successful, there has to be a shift in the perceptions of the local community. The entire culture has to change in order to appreciate the value and the benefits that can be achieved from brownfield redevelopment:

> This whole culture has to shift, so we have to look at how do we look inward and upward, how do we change the culture and a big piece of that is being able to design buildings and communities that are higher density, that are desirable that really add positive contribution that make you feel like I would love to live in that building [Tom, SCP, February, 2009].

In addition, Tom mentioned the local community's lack of demand for high density development as a barrier:

> But one of them is the demand for medium and high density housing shifting people's thinking around those things...getting people to envision what they can become [Tom, SCP, February, 2009].

The development community builds to reflect the demands of the local market. The local development community does not see brownfield redevelopment as an opportunity to generate profit because, according to Tom, there is no demand from the local market:

> Remember nobody builds anything unless they can make money doing it, in order for them to make money, they need to fill the thing up and get the rents out; they need to make the thing work financially. So, that's one of the big barriers, getting Londoners to think differently about living urban [Tom, SCP, February, 2009].

Charles pointed out that resistance from the local community is also a barrier that may hinder the process. Because brownfields are usually located in already established areas with surrounding neighbourhoods, the local community may resist the prospect of a new development entering their community:

> The other impediment, is one that comes with any intensification project, is that when you're introducing a more intensive form of residential development, particularly in central London surrounded by older neighbourhoods. It's not unlike it would be in any neighbourhood in the city when you're introducing a new form of residential development, they are always going to have concerns [Charles, SCP, March 2009].

The interviews also revealed that risk and cost were major barriers to consider when undertaking a brownfield redevelopment:

> Another barrier, which is the one with the incentives is try to deal with is risk and the cost of clean up, the way I like to put it is how do we get ourselves into a position where its risk management as opposed to risk avoidance [Tom, SCP, February, 2009].

In the following quote, Mary, a member of the planning committee, stated that the risks as well as the costs of brownfield redevelopment are major obstacles that need to be overcome:

> I were not to be sure of the degree of risk because what you can't see underground is often something that you'd always be worried that. I'm going to try to

> redevelop and then once I get going what am I going to find? We'd really love to see more brownfields in the city of London developed...we'd love to and we've offered up a number of incentives but it's a huge cost [Mary, MPC, May 2009].

Another participant explained that cost is the most significant barrier that needs to be dealt with to allow for successful brownfield redevelopments:

> Everything comes down to cost. Incentives come in different forms; they can be study grants or tax increment rebates or things like offsetting development charges or building permit fees, that kind of thing. In the end run, its sort of all money related [Bill, SCP, March 2009].

Related to the risk and cost, the issue of liability emerged as another barrier to brownfield redevelopment:

> Well, I think cost probably, even with the incentives, probably there's still cost. And still the stigma who knows what's still there? People are still nervous with the environmental issues and so on [Liz, MPC, March 2009].

Even if a site has been remediated, one city planner pointed out how the fear of future liability may deter potential owners from cleaning up and selling their sites:

> But there're huge liability issues with the city investing in properties, or with the private property owner cleaning up the properties and not knowing whether there was some [contamination] down the road, 10 to 20 years, still issues of migration of contaminates onto adjacent properties. There's still a lot of hesitancy, a lot of risk being taken on by the private sectors [Tom, SCP, February, 2009].

Equally, one land holder discussed the fact that fear of liability can present significant problems to brownfield redevelopment. Unremediated sites cannot be sold on the market, they must be remediated first. However, in some instances it is less expensive for an owner to hold on to a site without remediating it because the cost of cleanup is so high. Even if remediated, the seller still may not be willing to sell a site because of future liability concerns:

> So that property is, until it gets cleaned up its almost un-saleable. And that has happened a couple of times, there is a piece at location X that Company Z used to own and its so contaminated that they feel that its cheaper just to hang onto the 12 acres of land forever. ...If company Z sells that property, that doesn't take them

> off the hook if there is future issues, there could be future lawsuits that come back on company Z. So, my concern is always that you would think they might want to clean it up to release themselves of liability but then the clean up is so expensive that they're caught in that kind of scenario. Even if we found a buyer that was comfortable with the environmental issues, Company Z would still be a nervous seller because of future claims [James, PD, August, 2008].

Another major barrier to brownfield redevelopment comes from the fact that London's urban growth is so big that there is no demand for brownfield redevelopment. Mary explained that there is a cheaper and less risky option in greenfield development:

> Well I don't know if you'd call it a barrier but the fact that our urban growth boundary is so big. Well some will view that as an opportunity for growth at the periphery, I would view that as a barrier to brownfields development because London has a very large urban growth boundary because a lot of greenfields areas which is cheap to develop that the industry tends to want to develop on those lands as opposed to absorb some of the risks and the costs and associated problems with brownfields developments [Mary, MPC, May 2009].

Throughout the interviews it became apparent that the additional amount of work involved in the application process of brownfield redevelopment may deter would-be developers from considering brownfield redevelopment.

> If you got a site that you're not going to need to go through the development approval process like a re-zoning application. You're not going to be going after those sites. You're going to be looking for the ones that are just ready to go so that you're going to minimize any approvals that are necessary [Charles, SCP, March 2009].

In the quote below, a participant summarized the various barriers involved in brownfield development:

> Despite the changes the province made there's still liability issues, there's cost issues, there's planning issues where approvals are required if you have to take it through a public process, there's always sort of neighbourhood concerns about environmental contamination and what type of impacts the actual cleaning itself might have, you know, are you going to be creating airborne pollutants because of the demolition activity that is occurring or the excavation work, that kind of thing [Bill, SCP, March 2009].

During the interviews with the private sector participants, it was indicated that one of the most significant barriers to successful brownfield redevelopment was the considerable cost of remediation. More specifically, the amount of upfront costs required relative to the value of the property made it an unworthy investment:

> We were going to do it. Like I said, we had the quote for $60 000, we'll work it out into our business plan but then I think the final number is closer to $200 000, which puts the kibosh on the project because it's not a big piece of land right...but we've already spent the money. We're out the $200K and we had to pay for it [James, PD, August, 2008].

A private developer also mentioned that the cost of remediation and upfront costs required have the potential to force a developer to abandon the redevelopment:

> So if I'm doing my environmental remediation work at the same time as I'm doing my planning this is where I'm spending all my money right? So I'm spending a lot of money early but for the site planning process I really don't know what I'm going to have on my site until here. That could be ¾ of the way through my budget on environmental, what if the planning approval doesn't match my environmental approval? I'm screwed. Either that or I've spent too much money or I haven't spent enough money or my whole strategy has got to be redone [Betty, PD, March 2009].

In addition to the upfront costs, one land owner indicated that the barrier is compounded by the fact that banks are reluctant to give out loans on unremediated properties:

> Financing is one. You can't finance a site, banks want straight forward sites.... the banks won't touch them [Larry, PO, August 2008].

Cost was considered by all the participants in the private sector to be a major barrier to overcome. More importantly, the expected return on the property had to be significant enough to offset the cost of remediation:

> The bottom line is the dollar. So, if it's going to cost someone a million dollars to clean up the small site then there's no value in it [Linda, PD, ECA, February 2009].

Linda also discussed how the amount of money required to remediate a site and the hassle of remediation relative to the value of the land make brownfield an unprofitable venture:

> Well, the value of that property. There was a property that was an old gas station that had to be cleaned up, it had been vacant for 10 to 15 years. I kind of thought to them, like why are you bothering, do you really want that location? The cost of property was probably less but there was going to be a lot of headaches. I've worked on projects where if the remediation was going to be, let's say $1M and property's worth a $100 000, they're not going to do it even if someone's interested. It's not worth it for them to sell it because they can't, they are going to have to invest $1M for what right? [Linda, PD, ECA, February 2009].

Ultimately, the decision to invest in a brownfield redevelopment would be based on the economic viability of a potential project. One developer discussed how investment in brownfield redevelopment is simply not a good business model. According to Paul, the single most significant barrier to brownfield redevelopment is the infeasibility of the business model. A further barrier is that brownfield sites may not necessarily provide opportunities for development that meet the demands and needs of developers. More specifically, the challenge of marketability:

> For a company to take over an existing site and redevelop it with the cost with the environmental assessment, with the cost with the elements that need to be rebuild, tend to the land, everything else, it makes it a really difficult business model for somebody to do...So, the capabilities to develop, redevelop a residential areas without coming up with a very structure-focused marketed product that people want to accept is going to mean that it's going to be a difficult business scenario [Paul, EDO, February, 2009].

The immense amount of time and energy involved with brownfield remediation also served as a barrier to redevelopment. Furthermore, the difficulty of the process is compounded by the fact that the remediator must correspond with each government agency in isolation. This alludes to the possible creation of a brownfield regulatory body to manage the redevelopment process:

> Just the time perspective, the amount of time I put into that thing and then this and that and the other thing and then the MOE, they make you crazy right? Trying to your Phase I and your Phase II and you've got your record of site conditions and. None of these government agencies make it easy, you know, they really don't. If

> they can get out of their own way it would be really good [James, PD, August, 2008].

Similarly, in the comment below, Linda pointed out that due to the immense amount of time required to effectively remediate a site, developers are reluctant to get involved:

> People are a little bit sketchy about risk assessment or remediation systems that could take 10 to 20 years right [Linda, PD, ECA, February 2009].

A further obstacle to brownfield redevelopment was the actual remediation process. This private developer discussed the hassles associated with the remediation process and how it may deter him from future brownfield redevelopment projects:

> We were going to take it and we were going to do our own thing for $60K just to move it right? And this is one of those properties where you say if I can do it for a buck, I'll do it. But you know, 18 months of my staff time going to public meetings, dealing with politicians, dealing with rate payers. No, we would stay away from it. It would have been like a woman with syphilis, you don't want to go near that [property]. Would I go out, look out for brownfields? No way! [James, PD, August, 2008].

One of the main barriers in brownfield redevelopment is the issue of liability for future costs and litigation. The fear of future liability may even prevent the owner of a certain site from selling it. If an owner sells a property even after remediation is complete, that company may still be liable in the future. What is more, clean-up is so expensive that there is no incentive to remediate. Moreover, even if a company found a buyer for a site who is comfortable with contamination, the owner might not want to sell for fear of future litigation and liability:

> Yeah, and one of the concerns is always from a seller's standpoint, especially if it's a big company. Liability will still sort of rest on them, even after they sell it, there is always a concern about people coming back on them with lawsuits. If (company A) sells that property, that doesn't take them off the hook if there is future issues, there could be future lawsuits that come back on (Company A). So, my concern is always that you would think they might want to clean it up to release themselves of liability but then the clean up is so expensive that they're caught in that kind of scenario. Even if we found a buyer that was comfortable

> with the environmental issues, (Company A) would still be a nervous seller because of future claims [Larry, PO, August, 2008].

This view was shared by Betty who explained that liability is a major barrier to redevelopment. In some cases fear of future concerns of liability actually deter the owners of properties from selling their sites. This suggests that this fear of liability is contagious and poses a significant barrier to brownfield remediation:

> They are still hesitant about their liability, Oil Company B. They will never sell their stuff. When you start to involve the science, that's kind of a very fuzzy area. The vendors' understanding of their own liabilities, some of them don't believe it's a liability and get stuck later and that puts a negative, kind of like a negative feeling out there for brownfield development. One guy gets burned once then he stays away from it completely [Betty, PD, March 2009].

Liability was considered by most participants to be a serious issue that may hinder the redevelopment of brownfield sites. To quote one private developer with extensive experience with brownfield redevelopment:

> Because what's happening is when we buy a piece of property off somebody, we limit their liability from the time that we've bought it, but someone comes along later, says, you know, this contamination has leached onto our property then we don't identify the owner of the property before us, we're able to show here's what we did to clean it up. That contamination isn't from us, it's from the guy that owned the property before and that's the issue they have to deal with [Alex, PD, March 2009].

Another participant described the fact that the owner of a site must remediate it before it can be sold on the market, can also present itself as a barrier to redevelopment. This developer discussed how the entire process is a frustrating endeavour, particularly the rezoning and remediation process:

> We had the land and I don't know if you know who Company B is, a non-profit organization, so they've got city money, they've got CMHC money and so we sold the site to them so I had to re-zone the site and they got its site plan approved. But to do that we had to remediate the site because it was an old brownfield... It's a very frustrating exercise...we have been working on this thing forever [James, PD, August, 2008].

Others mentioned that stringent cleanup standards also pose barriers to brownfield redevelopment. This private developer noted that if the level and process of cleanup required are too onerous, he will simply not engage in redevelopment. Alex also explained that this will eventually lead to cities abandoning promotion of brownfield redevelopment, which will inevitably result in undeveloped sites all over the province:

> And this is my argument. As you are aware now, MOE is creating more stringent categories of clean up but its coming to the point where if you make it so onerous for us to clean up these sites, we won't because we just can't do it and the cities will get to a point where they figure that even with the tax dollars that are coming later on, it may not be prudent for them to be in that game of promoting it. So what's going to happen is then you're going to have contaminated fields of properties that aren't cleaned up [Alex, PD, March 2009].

A minority view, expressed by only two participants within the private sector, was that a lack of experience can hinder the process of redevelopment. Developers might not know CIP exists and start redevelopment on their own but once they do that, they are ineligible for any of the incentives:

> When I went in there and I was talking to these guys about it and I said, I am the first one. So, I know they would be better at the next one. But we were all fumbling our way through it, all of us were. So I'm looking to them for answers and you know. Like, we couldn't have it finished or can't come in after the fact. It has to be all done out upfront beforehand and I had already started so now they are going, oh geez, you started it? [James, PD, August, 2008].

This land owner shared the above sentiment and explained how a lack of experience in brownfield redevelopment is a barrier that needs to be overcome. Redevelopment will take place only by those with experience, because it knowledge and understanding of how to deal with contamination:

> Quite often, contaminated sites are well located so it's a good opportunity, you need somebody who understands the contamination and isn't scared by it. Some people hear contaminated sites and run, but I think if somebody understands, quite often, you can overcome the issues and they're very profitable site you have to

> really understand what the problems are, if you're going ahead [Larry, PO, August, 2008].

There was unanimous agreement among all the participants that there are a variety of considerable barriers to successful brownfield redevelopment in London. All of the participants were quick to identify a number of barriers. Factors such as cost, liability and risk were considered to be the main obstacles in brownfield redevelopment.

5.4.4 Obstacles Stemming from the City's Organizational Structure

When participants were asked if they saw any obstacles stemming from the City's organizational structure that may interfere with brownfield redevelopment, one respondent believed that there may be some difficulty in gaining approval for land-use changes:

> There might be some issues relating to land use on sites that might have historically been used for one particular thing. In some cases, it's difficult to get land use changes that might facilitate redevelopment, there may be policies in the official plan that in some cases don't support changes in land use designation [Eric, SCP, February 2009].

A respondent, Tom, also acknowledged that the stringent procedural process in the application procedure may be considered an obstacle stemming from the organizational structure of the City:

> Anytime you're getting money from the municipality, you know that it's going to be a bit of a bureaucratic headache and yeah, you do have to go through a process but I could see some people saying I don't want to deal with that [Tom, SCP, February, 2009].

Tom further mentioned that the time component of the process is another obstacle.

> You've got to propose something: give a business case and then you get the information back which can be a bit of a hassle if you got a property, for example, on contract so you buy it with a condition and then you got to go through this long process and it takes 6 or 8 months, and it makes it more difficult maybe your

> conditional purchase lapses.... So, could we have a better system which would streamline it more? Perhaps? [Tom, SCP, February 2009].

These concerns, while only a minority view, express the need to better manage and streamline the bureaucracy of the approval process.

5.4.5 Brownfields vs. Greenfields

One unexpected theme that emerged from the interviews was the competition brownfield redevelopment faced from greenfield development. All of the participants pointed out that one of the most difficult barriers to overcome in promoting brownfield redevelopment was the abundant supply of available greenfield land in London.

Eric believed that the abundant supply of greenfield land in London is a major barrier to brownfield redevelopment. The immense supply of greenfield land results in low demand to redevelop brownfields, and provides a safer option to development. From a developer's perspective, it makes more sense, logistically and financially, to invest in greenfield development:

> There's still land available in London to be developed in a greenfield setting and that's generally pretty cheap land, easy to access, redevelop and you don't have to worry about remediation on those sites. So, if that land is still available then that tends to attract developers, rather than going to a site that might be quite complicated in terms of having to do remediation first [Eric, SCP, February 2009].

A similar response is reported by Bill who believed that if given a choice, the more economically feasible option will always be chosen. For brownfield redevelopment to be successful, it has to be competitive with greenfield development. Even if the costs are to be equalized, the immense amount of time and energy associated with brownfield redevelopment makes it an unprofitable venture:

> For any developer it comes down to the business case you can make, I mean, if developing a greenfield site can be done in a less costly way, with fewer hassles

> and better assurances on their part that they can get done on a timeline that would suit them then they will look to those sites first [Bill, SCP, March 2009].

This private developer mentioned that competition and ease of development of greenfields relative to brownfield redevelopment deter developers from even considering the latter. Rather than absorb the associated risks involved with brownfields, developers simply find it easier to develop greenfields:

> London has a very large urban growth boundary because a lot of greenfields areas which are cheap to develop that the industry tends to want to develop on those lands as opposed to absorb some of the risks and the costs and associated problems with brownfields developments [James, PD, August, 2008].

When asked which type of development is more likely to take place: brownfield or greenfield? Mary asserted that greenfield development will win every time; despite financial incentives, competition from greenfield development is just too high:

> It's always greenfield, it's cheap, its easy, no hassles, in and out you build status quo and whereas brownfields you've got to deal with existing neighbours, you've got to be sensitive to the streetscape and the design, so ya...no, it's greenfield, no question [Mary, MPC, May 2009].

The availability and large supply of peripheral land in London is a major barrier to brownfield redevelopment. Tom stated that in places that have no alternative but to look inward and upward, brownfield redevelopment will be successful, but when you have cheaper and easier options, brownfields face major obstacles:

> Another barrier would be our supply of land...When there's a lot of supply, compare that to a situation like Toronto which's pretty much built out and some of the other municipalities in the GTA, you're going to see a lot more brownfield redevelopment because, you know, you're forced to look inward and upward [Tom, SCP, February, 2009].

Charles admitted that greenfield sites are usually the development community's preference. This is because in newly developing areas, there is no established community,

so local resistance will be minimal. He further added that it is easier from a planning and rezoning perspective:

> Greenfield sites by their nature and definition are going to be in newly developing sites so you're probably not going to be having a large neighbourhood that would feel that there was an impact from that development. It's a completely different thing to go into a neighbourhood that has been that way for 10, 15, 20, 30 years or even longer years and have an undeveloped lot and then say "coming soon" and have something completely different. Very often greenfields is going to win just on those kinds of things. And you know, you're not going to change that [Charles, SCP, March 2009].

Because it is simply a less arduous task to develop a greenfield site, it is hard to make the justification for brownfield redevelopment:

> If it's easier to build new houses in the greenfields, I think there's got to be even more than incentives because there's got to be a real push back to redevelop the core, make it less easier for people to do the simple things, and the long term poor planning for the city but easier for the developers. So, I think it's got to be less easier for them to do that then they'll be more encouraged to look at, not just brownfields but all kinds of infill developments [Liz, MPC, March 2009].

Another participant described that the attractiveness of infill development and intensification are gaining momentum and popularity so that greenfield development may soon become less attractive. Also, the fact that many of the suburban locations are secured by a small group of developers may actually force the smaller developers to look for alternative options in the core, and thus consider brownfield redevelopment:

> So, no, I wouldn't say by default that the greenfield is always more attractive. There's all kinds of issues around servicing down in the southwest for example that makes it difficult, there's certain benefits in terms of servicing in the downtown area, the availability of services and I think that the culture is shifting a little bit across North America and in Ontario where people are looking for more urban environments. Downtown's coming around, but it's a reasonable alternative and all the services are available to them. The other thing is a lot of the suburban locations they're secured by a fairly small group of landholders like big developers so it's tough to get a hold of lands like that and so you might have a little bit more selection of brownfield sites, particularly if you're a smaller developer [Tom, SCP, February, 2009].

In addition, Eric claimed that the rising costs of development may prompt developers to consider alternative options to greenfield redevelopment such as brownfield redevelopment.

> We're trying to limit sprawl and it's becoming more expensive now to develop on the fringes of the city, so I think you're finding more developers or land owners are looking at redevelopment opportunities in the inner city areas and they're recognizing the value of redevelopment in the inner city [Eric, SCP, February 2009]

In the following discussion James and I discussed the competition from greenfield development. If there is an abundant supply of greenfield land, the developer will almost always choose the greenfield location.

> Tom: When land is really hard to come by, then you can ok say here is an in-fill with these incentives that might turn the corner like I said, you tie it up and you do it. But, if there is a lot of greenfield stuff why are you going to [redevelop brownfields]?
>
> Interviewer: So you would rather develop a greenfield site than brownfield site?
>
> Tom: Yeah, I don't expose myself right
>
> Interviewer: So, unless there is a massive demand for land in a big urban area, what's the point, right?
>
> Tom: What's the point of going in and doing it?

All the participants were in agreement that brownfield redevelopment faces fierce competition from greenfield development. The cost and availability of new land is still relatively low in the periphery of London, thus the costs and problems associated with brownfield redevelopment make greenfield development a more viable option.

5.4.6 Effectiveness of Financial Mechanisms in Promoting Brownfield Redevelopment

During the course of the interviews, the participants were asked to assess the effectiveness of financial incentives provided in the London brownfield CIP. All the participants acknowledged that there was value in having a CIP specifically geared towards brownfield redevelopment. However, not all believed that financial mechanisms would be powerful enough to attract investment in brownfield remediation.

One respondent claimed that despite the CIP's infancy, the incentives offered have had some success thus far. An unexpected benefit of the CIP is that when an individual applies for funding, additional information on sites will be discovered. When one applies for any of the incentives offered in the CIP, a detailed report of the site and plan for future development has to be submitted to the city and this information is vital for both landowners and the city:

> Its been a fairly limited experience and we've had several grants provided for property owners over the last couple of years and I think that's been quite successful, it's provided additional information on the sites that's allowed the developers to make decisions on proceedings with development or not proceedings but it is important information to have, both for the landowners and for the city [Eric, SCP, February 2009].

Liz believed that the incentives make brownfield redevelopment more attractive. She added that without them, potential developers would not even consider taking on a brownfield redevelopment project:

> I think the policies that make it more attractive for developers to do that kind of development, infill development, brownfield development. The financial piece really adds that extra bonus, you know, or somebody probably wouldn't even look at it before and so that helps but I really do think that the policies, not just to encourage but policies to discourage the regular development that we've seen so much of in every city [Liz, MPC, March 2009].

Another interviewee stressed that providing incentives to remediate brownfields is absolutely necessary to encourage brownfield redevelopment:

> If they bought it and they're attempting to redevelop it and for a better use I think there has to be some sense of compensation I think that's a worth while initiative because in the absence of not offering up incentives then we just have the same old sprawl at the periphery of the city or they just don't attend to brownfield sites. [Mary, MPC, May 2009].

In addition to making brownfield redevelopment more attractive, Tom explained that the incentives in the CIP make it easier for developers to deal with risk; they do not eliminate the risk involved but do assist in managing it:

> [Incentives] deal with risk, manage risk, not eliminate but manage risk [Tom, SCP, February, 2009].

Tom also claimed that one of the effects of the incentives is that they relieve the demand for greenfield development by providing an alternative option through brownfield redevelopment. Incentives help alleviate risk and provide assistance with the cost of redevelopment. Without the incentives, redevelopments are unlikely to take place; they make brownfield redevelopment much more feasible.

> These are sites that are perfect for redevelopment, they relieve the demand for moving into the corn fields and yet, with the risk in the financial burden of cleaning it up they would never get off the ground without the incentives. I think that if we're going to be changing our culture, shift the thinking as to how we're going to grow brownfield incentives are a huge part of making that happen. If we're looking for quality design that sometimes cost more, well then those financial incentives become that much more important and make that form of development work in the feasibility analysis [Tom, SCP, February, 2009].

In the following quote Charles mentioned the fact that a lack of information on the level of contamination of a site is a barrier to redevelopment and that the incentives are an effective mechanism in dealing with barrier. The CIP provide potential developers with the opportunity to consider a brownfield and the CSA grant gives them the incentive to study a site.

> I think that if there is a silo that it would exist it would be around the information as to what and where brownfield sites may be, there's always a real concern on and I say that from a known brownfield sites, you don't like to share information

> around known contamination. The approach we take is that part of our incentives program actually goes to determine whether or not there's something there. So, we're not starting from the basis of we want that site fixed up because we know it's dirty or we want you to go to that site because we know it's not dirty so it's more likely going to be redeveloped, we're just saying we'll give you the incentives to determine what level of contamination exist and then go the next step as to what you have to do to make it developable [Charles, SCP, March 2009].

This view was shared by one land owner who stated that because the development community and the city have limited information regarding the levels of contamination, the Phase II CSA program can help shed light on the matter. Further, most are not willing to spend the money to investigate the level of contamination, so providing incentives to conduct CSAs is a good step to ensuring remediation. At the very least, this provides those who need to know with the proper information that will allow them to make an informed decision on whether or not to proceed with redevelopment:

> I think that in itself is a good step. A lot of people don't know how contaminated their properties are and aren't willing to spend the money or even find out. So, to take that, just document it, what the problems are is a good step [Larry, PO, August, 2008].

In the quote below Alex made the claim that incentives are one of the only reasons for which anybody would consider brownfield redevelopment. The availability of financial incentives make brownfields competitive with greenfields. The playing field has to be levelled and developers need a reason, such as some sort of compensation, for undertaking in a brownfield redevelopment project:

> It's the only reason why they are really getting developed. The only reason why we went there is again, they [The City] had this program, they have the old X factory and they needed it cleaned up to redevelop it. The property is right on the X canal so it's a nice piece of property for redevelopment but the cost of cleaning it up, they haven't touched it for years because the cost is greater than the value of the property, so again it's about apples right. So, if I have a clean greenfield site and I have a brownfield site, you want to be able to compete right so the

> competition you got to bring them up to that stage so the developer needs that compensation [Alex, PD, March 2009].

One developer commented that incentives are effective in promoting brownfield redevelopment but there are other issues to consider as well. The comment below indicates that incentives alone do not assure success. More important than the incentives is the development potential of a site. Alex claims that market conditions have to be right for it to be successful:

> Well, there are two things really... the incentives were part of it and then it's the redevelopment potential... the best places to go are what I call the emerging areas it's the, you know, people develop to a point and then the regeneration of neighbourhoods comes along and so, you go to where those neighbourhoods are regenerating [Alex, PD, March 2009].

Another participant explained that because the City is not familiar with the development process as a business, they lose sight of how the development industry operates; thus the incentives they provide do not apply to the many levels of operations in the actual business side of the industry:

> Well, it's not that it's practical, it's just, once again, and I don't want to be critical of the municipalities because I know the guys who wrote this but sometimes they lose sight of what the process is [James, PD, August, 2008].

In the quote below, a developer with experience with brownfield redevelopment discussed the complications involved. In this case, the developer's company only wanted to sell the property but not develop it; to do this they had to first remediate the site. However, this made them ineligible for a development charge rebate because they were not developing the property. In this way some of the incentives may be ineffective. The way the development charge rebate is structured might actually hinder the process because the owner of the property has to remediate the site before selling and therefore is ineligible for development charge rebate.

> But the problem is we are not applying for the permit. So the city had to get their head around who the end user was, who was going to get the rebate money back, how they were going to structure it because when I first went through that document I said, this doesn't apply to us because I'm not going to apply for a permit for a rebate. So we went in to talk to the city and I said you know what? We almost scrapped the project. First we thought, it was going to be $60, 000 to remediate that site and then the money just kept going up...So, we are sitting there and saying well, we can't do it, we can't do it for $60, 000. So that's when I went to the city and said I got to kill this deal. But they said well, what about this thing and I said well I'm not applying for the permit, I'm going to sell it....So, they had to come up with a mechanism that said ok well when Homes Unlimited applies for that we will rebate X group back the money. See, what I mean? It's a break on the DC, is what it is right? So that's how this is going to work so I had to get X Unlimited to sign a sheet that said when they apply for the permit, the city will be allowed to rebate me back the brownfield thing but that is not how that thing is structured [James, PD, August, 2008].

As a result James recommended that incentives should be structured in a way that offer more incentives to the actual remediator of the site rather than the developer because in many instances the seller/owner of the property is not the developer. The incentives should be structured in a way that provides incentives to owners to sell rather than develop. James affirmed that a major flaw in the rationale behind the CIP is that it assumes that the whole redevelopment process is done by one company, one developer. However, as James points out, that is seldom the case. It is a process that involves several different and independent parties:

> James: You know, you have a piece of... land, its brownfield. To unload it, to get rid of it, to sell it, you know, that's how that thing should be structured. They should help the guy to remediate it so that he could move it, because that's the problem...So, the best way to structure that is, provide the incentive to people who own the brownfield stuff so they can move it
>
> Interviewer: This pretty much makes the assumption that the whole process is done by one company, one developer.
>
> James: And that is seldom the case

When asked to comment on the effectiveness of the incentives James acknowledged that they were a good start but are not enough to promote remediation. Rather, they promote development because in most brownfields, the owner of the site simply wants to sell it, and development of the site is not necessarily a goal. So James proposed that incentives be targeted in a way to assist owners in remediating and selling their properties. Unless the owner/seller knows who the potential buyer is beforehand, a deal cannot be struck between the seller, buyer and city. The incentives are useful for someone who wants to undertake the entire process but do little by way of providing incentives to the middle men. And to further complicate the matter, the seller cannot remediate the site unless the seller knows what the end use will be because the end use of the site dictates the amount of remediation required. For example, an end use that is residential would have completely different cleanup standards than for a site destined to be a park:

> James: It's a good start...Ok, we'll make sure we can rebate you the stuff but it doesn't provide the incentive for people to clean, so lets say, I have this piece of land, unless I had somebody coming specifically to me with a use then I can tie it up with an offer of purchase and sale I would never undertake to do this. So how do you go about it? If you have a gas station say...why not provide incentives to Fuel Company X to get rid of their tanks on the site through a mechanism that does not contemplate what the end user is. Do you see what I mean?
>
> Interviewer: Yeah.
>
> James: And I don't know how you do that because you are trying to, the city is trying to create development on brownfield sites so they want an end user but that is not always how it works.
>
> Interviewer: That is seldom the case and the end user isn't always known.
>
> James: Exactly. So how do you create an incentive to clean up these sites without knowing who the end users is? And I don't know that you can. Yeah. Like you said, like I said, there are different exceedances, so if that was the commercial site I might not have to meet the same threshold, it might not have been strict right. So why would I sit there and remediate for residential.

All the public sector participants believed the financial incentives were effective mechanisms in promoting brownfield redevelopment, and all the interviewees acknowledged that there was value in providing financial incentives. However, it also became clear that those in the private sector did not believe that the financial incentives were strong enough to attract investment in brownfields.

5.4.7 Alternatives Beyond Financial Incentives That May Promote Brownfield Redevelopment

Another question asked during the interviews was: Is there anything beyond financial incentives that the City could be doing to promote brownfield redevelopment? All of the participants acknowledged that the City could be doing more in terms of creating awareness and active promotion.

More specifically, it became apparent that the City should be doing more in terms of promoting their brownfield CIP. In the discussions with the developers who utilized some of the incentives, they pointed out that they were only made aware that the City offered incentives once an expression of interest to redevelop a brownfield was communicated to the City. In one particular situation, a developer went to the City to express concern about the cost of remediation and was about to abandon the project due to the high costs. It was only then that the City made the developer aware of the incentives:

> So, we are sitting there and saying it, we can't do it. So that's when I went to the city and said I got to kill this deal. But they said well, what about this thing (referring to the development charge rebate) and I said well I'm not applying for the permit, I'm going to sell it [James, PD, August, 2008]

As indicated above, there seems to be a lack of awareness in regards to the incentives. In the quote below, Charles, a senior city planner, discussed ways in which the promotion and communication of the CIP could be improved. Charles noted that connections between brownfield redevelopment and the goals of the city in terms of urban growth management and sustainability need to be better communicated so that the development community and public can better see the benefits to brownfield redevelopment:

> Certainly we should promote and communicate a little bit more and try to get that word out so that folks know that they're there. And maybe to make a more explicit connection between those incentives and other things that we're trying to accomplish as a way to help reinvestment, redevelopment intensification, probably do what we can to highlight some of the benefits to some of these sites with respect to stabilizing and being a benefit to the existing neighbourhoods. We probably don't do as good a job with those kinds of things [Charles, SCP, March 2009].

This lack of awareness of the incentives and a general misunderstanding of the benefits of brownfield redevelopment can pose significant obstacles to the success of the brownfield community plan in London.

Mary, a city councillor, expressed concern that the general public lack an understanding of the term brownfield and that they need to be made more aware of the issues. The general public is largely concerned with paying taxes and recoil at the thought of paying higher taxes. As a result, the public is generally reluctant to spend more money on taxes that go into the hands of developers. According to Mary the public's perception is that the incentives are geared towards putting money in the pockets of developers rather than for the public good:

> Often at my meetings we'll talk brownfield development and they have no idea. I would say that the vast majority of public don't necessarily understand what it means, they don't understand the risks or the problems with it, they often don't understand any connectivity ... and the general public I think just cares about their taxes and not necessarily wanting to put any more money into doing anything for the greater good or they often see its for some personal private developer's

> interest as opposed to getting rid of contamination for the legacy of the future [Mary, MPC, May 2009]

In addition, Mary also displayed her frustration over the challenges involved in trying to make the general public aware of the issues involved in brownfield remediation:

> We have grown in such a fashion and especially since 2000, its pretty much been all at the periphery that when people go home they tend to not have an idea of what it means to live in liveable city, a walkable liveable city, we're so disconnected and they love their neighbourhoods and they get very defensive, what do you mean my neighbourhood's not liveable walkable, its how we make those terms, how we make them understand what it means? [Mary, MPC, May 2009].

In this quote, Eric acknowledged that public awareness is an issue that may hinder the success of the CIP. Eric noted that there are still a number of people conducting environmental site assessments on potentially contaminated properties but are unaware that the City offers incentives to offset the cost of Phase II ESAs:

> We still find there are people that are doing the site assessments, reports that aren't necessarily aware of the incentives that we have. We've done some presentations in the community and reported to planning committee. It doesn't always get through to everyone that may be involved in brownfield development. I think there's more that can be done to increase public awareness [Eric, SCP, February 2009].

Similarly in the comment below, Bill claimed that in order for brownfield redevelopment to take off in London, a change in the perceptions of the development community is needed. By reducing the amount of uncertainty involved in brownfield redevelopment, developers may have the confidence to invest in brownfield redevelopment:

> I think you have to be able to give them the confidence that when they get into the process at the end of the day they're going to be able to have a viable timeline that they can work with and its reduces the amount of uncertainty [Bill, SCP, March 2009].

In the conversation below Tom and I discussed the fact that the planning department has done a relatively poor job of actually marketing the incentives. Tom made reference to the difficulty of accessing the information on the City's website:

> Tom: Now that's probably a weak spot of ours, we're a planning department. We're not very good, to be honest with you, at marketing...It's something, and again I don't even know what we have by way we have information on the web, I think there's something there.
>
> Interviewee: Yeah, you have to dig. You have to know it's there to find it right?
>
> Tom: Yeah, which is the case with a lot of our stuff. So I'm actually off right now trying to re-shape our planning division website. The philosophy of corporation has always been, we don't want a planning division website, that's not the way people think. If you want brownfields incentives, have that as a separate subject but the problem is you have so many different subjects that's it gets totally buried. So communication I'd say that's one of our weak spots marketing and communication of the program.

To combat the lack of awareness, Tom recommended that the city engage in active promotion of brownfield redevelopment through the use of convention-style showcases where properties, city departments, sellers and buyers can exchange information and knowledge and get the word out to the development community:

> One thing that we don't do is have the showcase event. We get these big brownfield sites that we would like to see developed, and get realtors coming through and you know, trade shows sort of things where you can have the convention centre filled up for a discussion on brownfields and all the incentives we have and here's some great sites that are just right for redevelopment hoping that the right person comes along and just again, like in a trade show format gives people an opportunity to see it all at once and the planning improvements people could be there and the incentive people, engineering and all the information on the sites and the landowners themselves, we talked about marketing [Tom, SCP, February, 2009].

All the participants were in agreement that the City needs to be doing more to promote the brownfield redevelopment as well as better communicate the existence of a CIP specifically aimed at brownfield redevelopment.

5.4.8 Importance of Knowing How Many Brownfields Are in London

The entire justification for Chapter 3 is based on the argument that before effective policy aimed at brownfield redevelopment can be implemented, cities must know the extent of the problem. As a result, it was appropriate to determine whether or not this sentiment was shared by the research participants as well as to determine whether the participants knew how many brownfields were located in London.

Regarding the participants' knowledge of brownfield sites in London, all the respondents admitted that they did not know the extent of the brownfields in London.

With regards to the importance of knowing the extent of the brownfield problem, participants expressed mixed opinions about the matter. Some thought it to be imperative, while others considered it important but not a priority.

Eric recognized that an inventory of sites would be useful information but the process of compiling an inventory is cost prohibitive. Until actual site assessments are administered on a site by site basis, it would be almost impossible to have a list of sites. Further, there are liability and land owner rights issues that come into play when labelling a site a brownfield. Eric cautioned that care must be taken in the labelling of a brownfield because the consequences to the land owner could be detrimental in terms of property values:

> Well, it would be useful information but its difficult, unless you actually compile an exhaustive inventory which would be very expensive and a lot of them, you could guess would be brownfields, former gas station sites but until you actually do testing it's difficult to say that this site is brownfield because you get into issues of land owner rights and liability issues where if you call it a brownfield then you need to have something to back that up and unless you have site information, soil information, you can't really go out and call these sites brownfields because you don't know for certain and because it affects property values and land owner rights, you need to be careful in terms of what you actually calling or for naming sites as brownfields. There is information available for the sites that we've received Phase II reports on, that's public information. But that's

> about as far as we go we don't have a list that we make public and call them brownfield sites. [Eric, SCP, February 2009]

One city official outlined the importance of knowing where and how many sites are located in London. Mary claimed that because the City has no means of predicting future sites, having an inventory of sites would be useful:

> I think its really important that if I have a business in an industrial area and I get approval and it's a low use...lets say its an agricultural piece of land and I come in and get a re-zoning for my business which is going to be some sort of contracting plumbers and fitters group and I've got all the plumbing equipment and I get my...the zone for it and then I operate for 10 yrs and decide to move my business and I sell it to you and you happen to have a business that's going to be refurbishing tractors or old machinery or something like that or something that has a different footprint in terms of contamination, the municipality, we don't have a clue who's selling properties when they're all industrial, there's not that way of knowing because you don't need approval from us you simply have taken that industrial zone on it and applied..... I don't think as much attention has been given going forward for planning approval...is this a potential brownfield...what could the potentiality be? And we don't seem to have anyway of registering or red-flagging what possibly could be a future brownfields problem [Mary, MPC, May 2009].

Another city councillor said that by knowing where the sites are located, specific areas could be targeted for redevelopment. By knowing where they are, wider community planning can be strategically targeted and achieved. However, the councillor also stated that knowing where the sites are is not at the top of the City's priorities:

> I think that would be interesting to know and then you could say we could redevelop this whole pocket. If we're looking at community plans, where the brownfields are located, what can we do to sort of make sure they get redeveloped properly... I think it would be really important to know, I wouldn't say it's the top of my agenda but it would be something as we move along and talk about how we're going to grow in the future, then that would be an important piece to know and then we can factor that in when we're talking about redeveloping SoHo and the riverfront. As we move along that's going to be important information [Liz, MPC, March 2009]

Tom acknowledged that the lack of information on the extent of the issue may be a barrier to successful redevelopment projects; however, it was noted that one of the objectives of

the CIP was to alert the city of contamination through the CSA program. For every application to any of the incentives, proof of contamination has to be presented. In this way, the city will slowly build an inventory of sites. However, Tom did agree that having a base inventory of sites would be helpful:

> One of the barriers is people knowing where the brownfields are, what the extent of the contaminates are? When we were doing our policy work that was one of the things that kept coming up is, do we have inventory, what about an inventory? It's important that you update as there is cleanup and usually there wouldn't be an underutilized site wouldn't come off a list of underutilized site unless it's developed and wouldn't be developed unless it's cleaned so I think there would be some sort of mechanism that's possible to say ok this one here's gone. You know if I'm working on a project, its gone through this process we better get back to the inventory and update it. But its getting that base inventory in place that would be really helpful [Tom, SCP, February, 2009].

This developer discussed the inherent difficulties of trying to determine how many brownfields there are in a city:

> Ok, you go to the city of Brampton and they say, we don't have an old industrial area so we don't have any brownfields. Well, I personally know of about 3 and so, you don't have to be a 100 years old to be a brownfield; you need to have something that leaked. That could be a dry cleaner, gas station, auto shop. Actually, there's one factory, that building cannot be any more than 10 years old. So, it's nice for municipalities to know but they'll never know them all [Betty, PD, March 2009]

Alex, a private developer, discussed the importance of knowing the extent of the brownfield problem in a given city. Alex asserted that knowing where and how many will dictate policy:

> If you're doing any planning in a city you got to know what you're dealing with because you're going make a policy about something because here's the city centre area and we have brownfields here, here, and here. We have these brownfields within the core, we want to clean up the centre so let's start there. So, this becomes our brownfield area #1, then #2, #3, we're not dealing with those because we want that to be industrial in the future and if not, we'll get to it. We don't need to deal with them, so lets create priorities which the priorities for us in an overall planning for creating what's good for the city [Alex, PD, March 2009]

The above quotes show that even though not all the participants were in agreement about the importance of creating a database of brownfield sites, there was unanimous agreement among the interviewees that having knowledge of where and how many sites existed would be a valuable source of information.

5.4.9 City Officials Opinions on the Role of the Private Sector in Brownfield Redevelopment

During the interviews with the city officials, I asked them to comment on how much of a role the private sector should play in brownfield remediation. Most of the city officials agreed that the private sector needs to become more involved in the process and that the CIP will provide the means for this to occur. Eric indicated that as development on the periphery becomes less desirable, developers will look to brownfields as opportunities for development:

> I think their role could be substantially increased and we are getting some of that in more recent years. I think, part of it is that the programs that we're offering are providing incentives, I think in some cases making a difference and another part of it is we're trying to limit sprawl and its becoming more expensive now to develop on the fringes of the city, so I think you're finding more developers or land owners are looking at redevelopment opportunities in the inner city areas and they're recognizing the value of redevelopment in the inner city [Eric, SCP, February 2009].

However, because the city is not in the business of development, their responsibility can only extend so far, and ultimately the private sector must take the lead:

> So, unless we have private sector partners that are going to do that then all the programs in the world aren't going to do any much good [Bill, SCP, March 2009].

One city planner asserted that the private sector has the largest role to play in brownfield redevelopment. The city sets the stage and the development community takes the initiative:

> They got the biggest role. Like I said, we're not developers, we're not builders. So, they've got to step up to the plate and hopefully then do the project because we don't do that. So that's their role and so what we've got to do, I guess is to find out from them is there anything that we do or can do or need to do to make them step up to the table, is there not [Charles, SCP, March 2009].

One city planner claimed that the role of the private sector is simply to generate profits. Unless they see an opportunity to generate profits they will not engage in brownfield redevelopment. Tom has no expectations that the private sector will take on the responsibility to create better living environments. However, Tom acknowledged that there are some leaders in the development community who are willing to take the risk and because success breeds success, Tom is hopeful that they will eventually realize that brownfields are manageable and profitable endeavours:

> Well, the first thing is my expectations of the private sector are to do what makes sense financially. But the main philosophy I think has to be, don't expect the private sector to just say we need to reduce air quality or reduce air emissions we need to this and that. I think there will be some leaders in the private sector that will say and I'm going to give it a try and its nice that we've had people from outside of the municipality come in and show us that's possible You need developers that are willing to take a little bit of a leap of faith [Tom, SCP, February, 2009].

In the quote below, Liz expressed that the development community needs to be willing to take more risk. Liz also communicated hope for the future. According to Liz, a new generation of innovative developers are seeing the potential and associated benefits of brownfield redevelopment:

> Well, they'll have to get on the train or get left behind...So, I guess they haven't believed that people may actually just want to live in some other kinds of developments. So, I think they're coming around, I don't think its going to happen overnight. But there's a new generation, I've noticed some of the younger ones are more keen to sort of understand what's going on and maybe take a look, you know, maybe a bit more gutsy in terms of taking a plunge at trying something new [Liz, MPC, March 2009].

Many of the city officials claimed that the City is not in the development business and thus their role is simply to facilitate development. Ultimately, the development community has to take the initiative in brownfield redevelopment.

5.4.10 Role of the City

Participants were asked to discuss the role of the City in brownfield redevelopment. Most of the public sector respondents believed that the City is not in the business of redevelopment or remediation; rather, the City's role extends only as far as facilitators of redevelopment. However, one city planner indicated that despite acting primarily as regulators, the City could be doing more by actively purchasing and remediating sites. Eric acknowledged that the City has little experience with brownfield redevelopment and believes the role of city will change to that of actual developers in the future:

> I guess the city is not that actively involved in undertaking remediation ourselves. So the city could be a little bit more actively involved in actually acquiring land and facilitating redevelopment on the lands but we could take a little bit more active role in trying to facilitate redevelopment of certain areas through acquiring lands and either undertaking remediation ourselves or doing it through request for proposals from private land owners. [Eric, SCP, February 2009].

A similar response was reported by Charles who agreed that the City is not in the development business; their role extends only as far as providing the CIP:

> By having programs like this it shows that the city does have a desire to participate with the development committee, we're not developers, we don't go out and do it and I don't know that we'd ever want to get into that business. We're in civic administration, not construction development and so we provide the incentives for those folks who are in the business to do that [Charles, SCP, March 2009].

Mary stated the city has done its part to assist in the redevelopment of brownfields in London. Mary pointed out that the brownfield issue is really an issue of national and

provincial concern and since the federal and provincial governments have potentially unlimited funds, they should create incentives aimed to promote redevelopment as well. Mary also asserted that the City, province and country need to coordinate their efforts but this coordinated approach has yet to materialize. As long as each sector of the government is operating in solitude the brownfield issue will face serious difficulties:

> I would say I don't know whether it's the city that should be able to offer all of the incentives, it seems to me that brownfields are a national and a provincial kind of issue. From my perspective, the pockets are a heck of a lot deeper when you get into the province and feds so if we're all in the business together to try to create more intensive cities, urban areas that are not sprawling we need all 3 players at the table, so if we're offering up incentives and the province is and the feds are then a developer would be encouraged. We don't have from my perspective that coordinated approach. From my perspective and so as long as we are all still dealing in our silos, I'm not sure we're going to get very far [Mary, MPC, May 2009].

The City needs to create a vision of better living, a way to present the issue of brownfield redevelopment in a way that the public will accept and begin to see the benefits of this type of development:

> Giving people a vision that's where I think we've got to show leadership as planners, giving people a vision of what those areas can become and facilitating development of those areas in appropriate ways at an appropriate location to make them really desirable. I think that's really important to allow the brownfield model to make sense [Tom, SCP, February, 2009].

However, Liz affirmed that the city has a major role to play in facilitating redevelopment. In order to prompt brownfield redevelopment, the city needs to make it more difficult to develop greenfield sites thus forcing developers to consider brownfields as a viable option:

> Our developers have been pretty spoiled because they've just be able to do whatever they want, whenever they want, wherever they want for all these years. So, it's going to be, there's a new game in town now with more restrictions. So, they aren't going to be able just to do what's easy because it's not going to be as easy to them anymore. So, I think the municipality has a big role to play because

> otherwise why would people bother. It's more work, it's contaminated, it's just a whole lot of headaches [Liz, MPC, March 2009]

Here, one participant stated that the city needs to be taking a more proactive leadership role in brownfield related matters:

> I think making that better known or maybe packaging it differently for the benefit of potential developers just so you can make the case more explicitly or clearly that these things are much better deal for a whole bunch or reasons...so its not clear to me that that is happening and my impression is that the city has not really taken a real leadership role. It's not my impression that they're really hustling these or they're really pushing them or being very proactive [Steve, NPIG, February 2009].

This private sector participant believes that the city needs to provide access to the information more efficiently (e.g. on the internet):

> Make it easy to find... electronically...Cities throw websites up, throwing information on it but they don't go on search option, engine optimize it, they don't basically make sure that its being marketed in the correct format. The information is out there but if you have to get to the 4th or 5th page of organic Google searches to find stuff, it's not going to be beneficial and cities have to take a better focus on using the electronic tools more effective.

One participant believed that the role of the city should be to create a perfect balance of incentives that actually lead to a demand to develop brownfields. Alex claimed that the city need not take an active role in development but make incentives work to a point where they create demand, ultimately resulting in developers bidding to take on brownfield redevelopments:

> I think what you want to do is the perfect mix put the perfect amount of incentives and encourage private stakeholders and if you could come with a perfectly supported program that created enough demand you actually have private stakeholders bidding for projects, that's the ultimate balance. If you could have the incentives work to a point that they drive enough interest and there's enough economic benefit for doing that and you have competing private interest after an opportunity so every time that a building becomes available someone wants to come in and do the redevelopment that's the perfect mix and that's where you want things to sit [Alex, PD, March 2009]

This private sector interviewee discussed at length the ways in which municipalities need to prioritize where brownfield redevelopment fits into their policy agenda. Betty claimed that cities need to target exactly where they want redevelopment to occur:

> Municipalities should prioritize where brownfield redevelopment is, if it is something that is of critical importance to them then they need to put a program in place that actually works otherwise they're just going to get that low hanging fruit. [Betty, PD, March 2009].

In addition, Alex asserted that cities have a major role to play in brownfield redevelopment, and that they need to find a balance between the practical realities of the economy and their goals:

> They have a vital role to play and that's the sort of the role that government should play is that they want a more vibrant city, they have a definition of what a vibrant city would be and its sort of the interaction between sort of the practical realities of an economy and what you want to see in your city and so, its really a question of how you're going to use your tax dollars and your money and by creating these incentives they have areas that are regenerating [Alex, PD, March 2009].

Here Steve mentioned that those who stand to benefit the most from brownfield redevelopment should play the largest role in terms of direct involvement and funding:

> The province and the municipality are the primary ones who are close enough to it and the city because the city drives the bulk of its revenue from property taxes. So they're the potential chief beneficiaries so their interest should be larger. I'd say that's how it should work... degree to which you follow it should be commeasured with your potential benefit. So the closer you are the more your going to benefit, the greater the role you should play [Steve, NPIG, February 2009].

Regarding the role of the City of London in promoting brownfield redevelopment, the opinions were mixed. In general, those at City Hall expressed that the City's role should be one that facilitates redevelopment by providing incentives and expediting the process. Most of the private sector interviewees were of the opinion that the City's role should extend beyond providing financial incentives to include a more comprehensive and

strategic approach to brownfield redevelopment by better communicating its goals as well as by more direct funding.

5.4.11 The Role of the Federal and Provincial Governments

The respondents were also asked to comment on what roles the Federal and Provincial governments should be playing in brownfield redevelopment. In general, the majority view was that the Federal government has a very small role to play in brownfield redevelopment. However, all the respondents claimed that the Province of Ontario should participate more in terms of direct funding and protection from liability. For example, Eric claimed that both the federal and the provincial governments could be doing more to provide greater incentives and stated that the province needs to introduce legislation that would reduce issues of liability once a site has been remediated:

> I think they could be more active as well because I know there are provincially owned lands and federally owned lands that may have some contaminations on them that the government could take a more active role on encouraging redevelopment of the sites and also providing more generous incentives. I think that they do a little bit of that, especially the provincial government but that probably could go further in terms of providing incentives and also dealing with some of the liability issues that they're creating some obstacles to brownfield redevelopment, especially at the provincial level [Eric, SCP, February 2009].

Without government intervention, sites would remain idle, and both province and city play an equally important part in promoting redevelopment:

> Well, if governments weren't active and the province hadn't have been aggressive in promoting brownfield development, the city hadn't responded and adopted its own programs then you know, put some money into it then these sites would just sit, you know, I think the cost and liability issues were such that people would have stayed clear of them [Bill, SCP, March 2009].

Tom criticized the province because they have left it to the city to provide the funding for the incentives. Tom would like to see the province take a more active role in direct

funding. This policy maker argued for more funding from the higher levels of government due to the fact that locally derived benefits eventually make their way up to the province and finally to the federal government:

> What we found about the provincial government on a lot of this stuff is that they've left it to the municipalities to pony up the dollars. They've given us legislation that helps us to deal with things like risk, but they've given us not a hell of a lot byway of direct funding to these programs. I think it would be great if the province could provide more. The way I look at it is what are the locally derived benefits, provincially and federally benefits and who's paying for those benefits? But I think if it was all on the backs of the municipalities I don't think that's really fair, thank you very much for giving us a tool to spend our money [Tom, SCP, February, 2009].

The following quote from two private sector participants represents their belief that federal and provincial governments should play a more active role in terms of direct funding:

> If we do want to redevelop, if that's the goal at hand, I think and federal government and provincial government is grants to redevelop because I think it helps the cities [Linda, PD, ECA, February 2009].

> The provincial government can help by continuing to put good programs in place... it would be great if the province has some good programs it would be great if they did more to put more funding into it [Mona, PD, March 2009].

In addition to the aforementioned, Charles noted that more direct funding from the province is necessary. This city planner made reference to the property tax program in the CIP and the fact that the Province will in some instances match the municipal contribution with funds from the education tax. However, to apply for this, a completely separate and equally rigorous application has to be submitted by the city to the province:

> The province's role right now is merely to offset the education portion of the municipal tax, so we can provide incentive programs where we would forgive all or a portion of the municipal taxes owing but it doesn't matter what municipal program there is, you still have to pay whatever education levies that would be assessed against the property. The province's role in what they've done to date in the brownfields program is that they have said upon application, they may offset

> that education component about the taxes. But it's a separate process, we have to do ours then we have to request the province, then we have to pass a bylaw on their behalf in order to not collect and then they'll give us the money. So, they did not make it particularly easy and so I think if they truly wanted to, they would probably come up with some easier ways. Maybe if they were to do something along the lines, just say, ok if it goes through the municipal rigor of being declared to be eligible, we'll just give you the cheque for the education portion rather than have us have to go through a completely different or whole other process in order to do that...if the provinces are interested maybe they could throw some money into the reserve as well so I think there are things that they could do [Charles, SCP, March 2009].

In the quote below, Linda claimed that Provincial clean-up standards are too stringent and make it more expensive to remediate, thereby deterring brownfield redevelopment:

> I think that having realistic standards, for one because right now they're proposing new standards, the ministry of environment is that would almost make it impossible to clean up too [Linda, PD, ECA, February 2009]

This city planner stated that the province has a role to play in terms of protecting municipalities against liability so that the city can acquire brownfield sites and sell them or develop them without fear of future litigation:

> There were two sorts of aspects as it relates to brownfield where the province has a role. The first is around the whole notion of liability. Nobody wants to get involved in the chain of ownership on a parcel that may or may not have site contamination on it because the last fingers in will probably be the fingers that get slapped and so there's always been a reluctance on the municipalities to pick it up as a land inventory and to say ok, we're going to bank these lands to provide opportunities for redevelopment and put them in sort of, in the municipal land bank and hold on to them. Municipalities are really reluctant to do that if they're going to; if there's any potential out there then they're going to be on the hook for rehabilitating those sites. The province could deal with that through their authorities that deal with those kinds of things and you take away those concerns [Charles, SCP, March 2009].

In the conversation below, Betty and I discussed the issue of liability and how cities cannot address this. Liability is a provincial matter and the province should provide more legislation in terms of protection from liability:

> Interviewer: Ok, back to the liability issue, is there anything cities can do to protect owners from liability?

> Betty: It's not really a city thing. It's more, there are 2 aspects of liability: civil and regulatory. So, the one we are talking about is regulatory, more of a provincial thing.

Another developer reiterated the same sentiment:

> Well that's a bigger issue. The legal liability issue is really, I don't think the cities have a role to play in that. I think it's the province and the federal government that really should be responsible through the ministry of environment to give you that, sort of once you've, there's got to be some way to limit the [Mona, PD, March 2009].

All the participants from both the public and private sectors shared the opinion that the provincial and federal governments need to provide additional funds to cities to give them the power to enhance brownfield redevelopment campaigns. Because the financial and social benefits of brownfield redevelopment eventually make their way to the upper levels of government, it is only logical that the federal and provincial governments take a more active role in brownfield redevelopment.

Table 5.1 Summary of Major Themes

- Importance of Brownfield Redevelopment on London's policy agenda
- Benefits of Brownfield Redevelopment:
- Barriers to Brownfield Redevelopment in London
- Obstacles Stemming from the City's organizational structure
- Brownfields vs. Greenfields
- Effectiveness of financial mechanisms in promoting Brownfield Redevelopment
- Alternatives beyond financial incentives that may promote Brownfield Redevelopment
- Importance of Knowing How Many Brownfields Are in London
- City officials opinion on the role of the private sector
- Role of the City
- Role of the federal and provincial Governments

Table 5.2: Explanation of Relevant Themes:

Summary of Participants' Perceptions of Major Benefits of Brownfield Redevelopment:

- Increases Tax Base
- Make Use of Existing Services and Infrastructure
- Putting Back Underutilized Land into Productive Use
- Fills the Gaps in Urban Fabric
- Contributes to Environmental Cleanliness
- Providing Alternatives to Greenfield Development
- Neighbourhood Revitalization

Summary of Major Barriers to Brownfield Redevelopment in London

- Low level of importance of Brownfield Redevelopment on London's policy agenda
- Public's negative perception of Brownfield Redevelopment
- Cost and associated Risks
- Liability
- The complicated Process of Remediation
- The competition from greenfield redevelopment
- Lack of demand
- Nimbyism
- Large urban growth boundary
- Arduous application process
- Immense amount of time with involved in Brownfield Redevelopment
- Lack of experience & expertise from both public & private sectors
- Development community Lack awareness of incentives
- Lack of knowledge on the extent and locations of Brownfield sites in London

Participant Responses to Effectiveness of CIP

- CIP applications provide information on site characteristics
- Make Brownfield Redevelopment More Attractive
- Necessary to Encourage Brownfield Redevelopment
- Assist in Managing Risk
- Reduce demand for Greenfield development
- Level the playing field between Brownfields & Greenfields
- Provides assistance with cost of Brownfield Redevelopment.
- Does not address development potential or market Conditions
- Assumes redevelopment process is done by one company (seldom the case)

Alternatives beyond Financial Incentives that may Promote Brownfield Redevelopment

- Better promotion of financial incentives & Brownfield Redevelopment
- Better marketing of financial incentives
- Making connections between goals of incentives and planning objectives
- Highlight the benefits of Brownfield Redevelopment
- Yearly conventions/forums to open dialogue between stakeholders

Participants' Opinions on the Role of City

- Active purchasing and remediation of sites
- Facilitators of development
- Coordinate with provincial & federal governments
- Foster local support
- Restrict Greenfield development
- Proactive leadership role
- Make Information more accessible
- Create demand
- Prioritize where Brownfield Redevelopment fits into policy agenda
- Find a balance between the practical realities of the economy and their goals

5.5 Conclusion

This chapter has reviewed the literature pertaining to brownfield redevelopment and policy. It has also outlined the methods employed in the interview analysis. Furthermore, the results of the study have been presented. From the interviews, several important themes emerged such as the importance of brownfield redevelopment on London's policy agenda, the benefits of brownfield redevelopment, the barriers to brownfield redevelopment, the competition brownfield redevelopment faces from greenfields, the effectiveness of financial incentives in promoting redevelopment, alternatives beyond financial incentives, the importance of knowing the extent of the brownfield problem, the role that the private sector plays in redevelopment and the role of the government. These concepts will be further explored in the next chapter.

Chapter 6: Discussion & Conclusion

6.1 Introduction

The objectives of this thesis were: 1) to develop a methodology for creating a brownfield inventory; 2) to indentify the barriers to successful brownfield redevelopment in London; and 3) to determine whether or not the financial incentives in the London Brownfield CIP are effective mechanisms in promoting brownfield redevelopment. The discussion is organized into 5 sections: the first section revisits the need to establish an inventory of sites in London; the second section discusses the many barriers to brownfield redevelopment in London; the third section will gauge the effectiveness of the financial incentives in the CIP; the fourth section includes the policy implications of this study; and the fifth section concludes with a discussion of the contributions and limitations of this research.

6.2 Towards a Database of Brownfield Sites, Revisited

It was argued in Chapter 3 that in order for planners and policy makers to produce effective policies aimed at promoting brownfield redevelopment, a detailed inventory of brownfield sites needs to be created. Knowing *where* and *how* many brownfields there are should be considered the first hurdle to overcome in the redevelopment phase. Therefore, it is strongly recommended that the City of London develop a database of sites using the method outlined in Chapter 3. Creating a comprehensive database of brownfield sites will allow the City's administration to gather information regarding sites for better planning and marketing purposes, manage these sites for the future, and consolidate all information

pertaining to brownfields in London. The preliminary results from Chapter 3 (p.41-47) showed that London's potential supply of brownfields is fairly extensive, thus further emphasizing the need to create a detailed inventory of sites. The interview analysis also showed that having knowledge of *where* and *how* many sites existed would be a valuable source of information (p.115-118). There are, however, ethical and legal issues to consider regarding making such valuable data publicly available. The presence of contamination on a site has the potential of instantly reducing a site's value on the real estate market. Public release of such information should only be done with great caution. Thus, it is recommended that the City create the list and keep it for internal use only. By doing so, brownfield redevelopment can be placed in a large scale redevelopment strategy and more effective policy can be created for future development.

6.3 Barriers to Brownfield Redevelopment in London

The interview discussions revealed a number of significant barriers to brownfield redevelopment in London. In general, the low level of importance of brownfield redevelopment on the City's policy agenda, the public's perception of brownfields, cost, liability, the complicated remediation process, and the competition brownfield redevelopment faces from greenfield development were the most significant barriers.

6.3.1 Importance of Brownfield Redevelopment on London's Policy Agenda

The findings of the interview analysis suggest that brownfield redevelopment alone is not given priority status on the City's policy agenda. However, London's planning council has shifted its focus in recent years to urban growth management, and brownfield redevelopment is one of many strategies being targeted to control urban

growth. Brownfield development is consistent with the prevailing planning principles of the city's policy goal of promoting compact growth and intensification. Furthermore, inner city revitalization is high on the City's policy agenda and because brownfield redevelopment can be used as a means to achieve these goals, it can be concluded that brownfield redevelopment is an important tool in contributing toward compact growth and intensification but only if embedded within a more comprehensive framework to promote inner city revitalization. Still, the results of the interview analysis indicated that brownfield redevelopment for its own sake not considered a priority. Even more, many of the respondents believed that brownfield redevelopment in itself is not enough to tackle issues such as sprawl or inner city revitalization, but is only one of many methods to do so. This policy position is consistent with the literature which tends to recommend brownfield redevelopment as part of an integrated growth management tool. Such an approach, it is argued, will only be successful if redevelopment schemes are incorporated within a wider and more comprehensive set of policy agendas (McCarthy, 2002; Raco & Hendorson, 2006).

6.3.2 Public's Perception of Brownfields

One of the main barriers to the success of London's CIP is how the public perceives brownfield redevelopment. One participant discussed that in order for brownfield redevelopment to be successful, there has to be a shift in the perceptions of the local community. The entire culture has to change to view the broader community benefits from brownfield redevelopment [Tom, SCP, February, 2009]. Community participation, support and acceptance are essential to the success of any brownfield redevelopment endeavour (Ellerbush, 2006). Furthermore, involving the community in

the decision-making process early on in the development process, can help foster understanding and acceptance while also prevent protest and opposition. Residents can help provide ideas about redevelopments that fit the needs of the community (McCarthy, 2002). However, in London, the general public does not envision the benefits associated with brownfield redevelopment; the demand for such development is low [Tom, SCP, February, 2009; Mary, MPC, May 2009]. And since the local development community builds to reflect the demands of the local market [James, PD, August, 2008], this lack of demand for brownfield redevelopment acts as a major barrier to brownfield redevelopment in London. As a result, the local development community does not see brownfield redevelopment as an opportunity to generate profit and thus does not invest in it. In addition, because most brownfields are located in long established neighbourhoods, the local community, due to NIMBYism, may resist the introduction of a new brownfield redevelopment in their locality. These findings highlight the importance of the local market's demands as well as the need to open a dialogue between the multiple actors involved in brownfield redevelopment.

6.3.3 Cost and Associated Risks

The interviews also revealed that risk and cost were major barriers that need to be overcome to allow for successful brownfield redevelopment. The considerable cost of remediation and upfront costs borne by the investor relative to the expected return and future value of the redevelopment make brownfields unattractive investments. It has already been established in previous studies that the cost of remediation is one of the most significant barriers to overcome in the redevelopment of any brownfield site (Adams et al., 2000; Alberini et al, 2005; De Sousa, 2006a; McCarthy, 2002). These costs have the

potential to either force a developer to abandon a project or discourage a prospective developer from even considering investing in a brownfield. If redevelopment costs are perceived as being in excess of the predicted value of the completed brownfield site, such places can remain idle for considerable periods of time (Adams et al., 2000). This is also compounded by the fact that banks do not give out loans or support projects where there is a risk and a possibility of loan default. Furthermore, the expected return on the brownfield redevelopment, relative to a new development, has to be enough to offset the cost of remediation. If not, the project would not be successful. Ultimately, the decision to invest in a brownfield redevelopment would be based on the economic viability of a potential project. The interviews revealed that the private sector considered investment in brownfield redevelopment as economically irrational. To most developers, a brownfield redevelopment is simply an unviable venture. The risks and costs associated with brownfield redevelopment make the business model simply infeasible.

6.3.4 Liability

The issue of liability emerged, from the interviews, as another barrier to brownfield redevelopment. McCarthy (2002) has argued that concern about legal liability for remediation is perhaps the most significant hurdle to brownfield redevelopment. The issue of liability is as complicated as it is common. Fear of future liability may prevent owners of sites from even attempting remediation. For example, even if a site has been remediated, owners are still reluctant to sell their properties for fear of future liability. Unremediated sites cannot be sold on the market, they must be remediated first. However, in some instances it is less expensive for an owner to hold on to a site without remediating it because the cost of cleanup is so high. If an owner sells a property even

after remediation is complete, that owner may still be liable in the future. What is more, clean-up is so expensive that there is no incentive to remediate. One participant described how the fear of future liability is a contagious phenomenon: "The vendors' understanding of their own liabilities, some of them don't believe it's a liability and get stuck later and that puts a negative, kind of like a negative feeling out there for brownfield development. One guy gets burned once then he stays away from it completely" [Betty, PD, March, 2009]. These findings correspond to the myriad of studies that have acknowledged how concern for liability is perhaps the foremost obstacle to overcome in brownfield redevelopment (Alberini et al., 2005; Meyer & Lyons, 2000; Moore, 2002; Pryce, 2003; Solitaire, 2005)

6.3.5 The Complicated Process of Remediation

The complicated process of remediation is also an impediment to brownfield redevelopment. The remediation process is a long, time consuming bureaucratic process that requires patience and an in-depth understanding of the entire development. Indeed, De Sousa (2005) has previously shown delays in the procedural processes involved can inhibit brownfield redevelopment. Many of the respondents in this study mentioned how the stringent procedural process in the application procedure may be considered an obstacle that would deter prospective developers from considering brownfield redevelopment. The immense amount of time and energy involved in the remediation is compounded by the fact that the developer must correspond with each government agency in isolation. For example, to gain approval for any of the incentives offered in the CIP requires communication with the City of London; filing a RSC or having a Phase II site assessment requires a correspondence with the province of Ontario. Each of these

dealings requires time, money, experience and expertise, much more than in a normal development endeavour. One developer described the entire process as a "very frustrating exercise..." [James, PD, August, 2008]. This issue emphasizes the role that experience and familiarity with brownfield redevelopment play in the process. Alberini et al. (2005) concluded that brownfield redevelopment ventures are more likely to be taken on by developers with experience in the field because they are more familiar with the process. For example, if a developer begins the redevelopment and is unaware that a certain incentive exists or misses a crucial step in the application or remediation procedure, that developer then becomes ineligible for the incentives once the redevelopment has begun. Meyer & Lyons (2000) contend that brownfield redevelopment requires expertise and a specialized knowledge of changing site remediation technology, regulatory requirements, legal liability risk exposures, and a detailed understanding of local market conditions and demands. This study has shown that such expertise is lacking in London.

6.3.6 The Competition From Greenfield Redevelopment

The results of the interviews showed that the decision to invest in brownfield redevelopment is stimulated principally by economic factors. The development industry is one that seeks to generate a profit at a minimum cost. Given the costs associated with brownfield redevelopment it is perfectly rational that greenfield development is heavily favoured over brownfield redevelopment by the development community. The idea that brownfield redevelopment is considered less cost-effective and entails more risk than greenfield development is also supported in the literature (De Sousa, 2000; McCarthy, 2002). This theme is also supported by the results of the interviews which showed that the competition faced from greenfield development is also a significant barrier to

brownfield redevelopment. All of the participants acknowledged that one of the most difficult barriers to overcome in promoting brownfield redevelopment was the abundant supply of available greenfield land in London. The immense supply of greenfield land results in low demand to redevelop brownfields, and also provides a safer option to development. From a developer's perspective, it makes more sense, logistically and financially to invest in greenfield development; if given a choice, the more economically feasible option will always be chosen.

While greenfield development may be more cost-effective than brownfield redevelopment, the social costs of urban sprawl (increased travel times, congestion, infrastructure expenditures, air pollution, and the loss of open space) can be equally detrimental to the greater public (Greenberg et al., 2001b). For brownfield redevelopment to be successful, it has to be competitive with greenfield redevelopment. Even if the costs are are equalised, the immense amount of time and energy associated with brownfield redevelopment makes it an onerous process that simply is not worth the hassle. Rather than absorb the associated risks involved with brownfields, developers simply find it easier to develop greenfields. This is a direct result of the fact that London's urban growth boundary is so expansive. The size of the urban growth boundary allows for peripheral development rather than intensification. However, in cities with limited greenfield opportunities, the cost of acquiring new land and developing new infrastructure and services is considerably higher. In such places, it makes sense that the emphasis placed on brownfield redevelopment as a viable alternative to greenfield development is much higher. However, in London, the available land on the periphery is not conducive to brownfield redevelopment.

6.4 Effectiveness of London's Brownfield Community Improvement Plan

Gauging the effectiveness of London's brownfield CIP is not as straightforward as discussing the barriers to brownfield redevelopment in London. To determine the effectiveness, the following discussion is centred on mechanisms of promoting brownfield redevelopment. To this end, I have elected to look beyond financial incentives into issues such as creating awareness, community participation, and the role of government.

6.4.1 Effectiveness of Financial Incentives in Promoting Redevelopment

Financial incentives are supposed to provide economic assistance to developments where the economic viability of the site is under question. During the interviews, the participants were asked to comment on the effectiveness of financial incentives provided in the London brownfield CIP. All the participants acknowledged that there was value in having a CIP specifically geared towards brownfield redevelopment. However, not all believed that financial mechanisms would be powerful enough to attract investment in brownfield redevelopment. One unexpected benefit of the CIP is that through an individual applying for funding, detailed information regarding the condition of brownfields is illuminated. When one applies for any of the incentives offered in the CIP, a comprehensive report of the site condition and a plan for the future development has to be submitted to the city and this information is vital for both landowners and the city. One private sector land holder shared this sentiment; because the London development community and the city have limited information regarding the levels of contamination, the Phase II CSA program can help provide additional information on levels of contamination. Further, most are not willing to spend the money required to investigate

the level of contamination, and as such, providing incentives to conduct CSAs is a good step to ensuring remediation or at the very least providing those who need to know with the proper information that will allow them to make an informed decision on whether or not to proceed with redevelopment.

Adams et al (2000) found that redevelopment prospects hinged on the availability of financial incentives, and the results of the interviews support this view. Interviewees from the public sector believed that the financial incentives included in the CIP make brownfield redevelopment more attractive and without them, potential developers would not even consider taking on a brownfield redevelopment project. Some stressed that providing incentives to remediate brownfields is absolutely necessary to induce activity. One public sector participant acknowledged that the incentives in the CIP make it easier for developers to deal with risk; they do not eliminate the risks but rather assist in managing them. Others mentioned that one of the effects of the incentives is that they relieve the demand for greenfield development by providing an alternative option through brownfield redevelopment and provide assistance with the cost of redevelopment. What is clear is that without the incentives redevelopments would never get off the ground; they make brownfield redevelopment much more feasible. This view was also shared by a private sector developer who claimed that financial incentives are one of the only reasons for which anybody would consider brownfield redevelopment. The availability of financial mechanisms provides an incentive in the form of compensation for undertaking a brownfield redevelopment. Moreover, they level the playing field between brownfields and greenfields. However, because the CIP is in its infancy, being only three years old, it is hard to gauge the effectiveness of the incentives in promoting brownfield redevelopment. As one public official pointed out, in order to determine the effectiveness

of the CIP, a study would need to be administered whereby the number of approved applications could be determined.

In contrast to the optimism expressed by the City, it became apparent from the interview discussions that financial incentives alone do not assure that brownfield redevelopment will take place. More important than the incentives is the development potential of a site; the market conditions have to be able to accommodate a successful endeavour (Meyer & Lyons, 2000). In addition, the interviews showed that because the City's administration is unfamiliar with the development industry, they lose sight of how the development industry operates, thus the incentives they provide do not apply to the many levels of operations in the actual business side of the industry. For example, in one case, one company only desired to sell a contaminated property, but not to develop it. To do this, the site had to first be remediated. However, this made them ineligible for a development charge rebate because they were not developing the property. In this way some of the incentives may be ineffective. The way the development charge rebate is structured might actually hinder the process because the owner of the property has to remediate the site before selling and therefore is ineligible for development charge rebate. The CIP should be structured in a way that offers more incentives to the actual remediator of the site rather than the developer because in many instances the seller/owner of the property is not the developer.

The interviews showed that a major flaw in the rationale behind the CIP is that it assumes that the whole redevelopment process is done by one company and one developer. However, that is seldom the case; it is a process that involves several different and independent parties. One developer pointed out that in most cases the owner of the site simply wants to sell a contaminated site, and redevelopment is not necessarily a goal.

Unless the owner/seller knows who the potential buyer is beforehand, a deal cannot be struck between the seller, buyer and city. The incentives are useful for someone who wants to undertake the entire process but do little by way of providing incentives to the middle men. And to further complicate the matter, the seller cannot remediate the site unless the end use is known because this will dictate the amount of remediation required. The point here is that the incentives do not promote cleanup, they promote development. In spite of this, the results indicate that financial incentives do aid in promoting redevelopment and that such developments centre on the availability of economic incentives, particularly in a city like London where demand for brownfield redevelopment is low. The overall findings here lend credence to the existing literature which has shown the importance of financial incentives in aiding redevelopment (Lange & McNeil, 2004; Simons & El Jaouhari, 2001; and Wernstadt et al, 2006).

One developer spoke at length about how the tax increment program is not as effective or beneficial as one might think. This program reimburses part of the municipal portion of the tax increase between a vacant site and a developed site. The amount of the tax is equal to the increase between the pre-development and post-development portion of the property tax. However, this program only comes into effect after the remediation and redevelopment have been completed. Thus it does not assist with any of the upfront costs involved in the redevelopment. This developer asked: "so here you've had to come up with money to do the works but you don't get paid for it until after it's done. So, that's hard.... you can't get a loan so how are you supposed to pay for it?" [Betty, PD, March 2009]

6.4.2 Beyond Financial Incentives

One of the questions asked during the interviews was: Is there anything beyond financial incentives that the City could do to promote brownfield redevelopment? All of the participants from the public sector admitted that the City could be doing more in terms of creating awareness and active promotion. The logic is simple, if the general public is unaware that incentives aimed at promoting brownfield redevelopment exist, then how can the financial incentives be successful? To attract a wider range of new, inexperienced developers, it will be necessary to create campaigns aimed at education and marketability (Alberini et al., 2005). During the interviews with the private sector participants, it became apparent that the City needs to be doing more in terms of active promotion. In the conversations with the developers who utilized some of the incentives, the developers were only made aware of the incentives after an expression of interest was communicated to the City. The connections between brownfield redevelopment and the goals of City in terms of urban growth management and sustainability need to be better communicated so that the development community and the general public can better see the benefits to brownfield redevelopment, thus leading them to support such programs. This assumption supports Solitare's (2005) findings that creating awareness and involving the public in the decision making process is absolutely essential to the success of any city-wide brownfield redevelopment campaigns.

Furthermore, there are still a number of people conducting environmental site assessments on potentially contaminated properties but they are unaware that the City offers incentives to offset the cost of Phase II ESAs. One public official admitted that the planning department has done a relatively poor job of actually marketing the incentives; furthermore, the information on the City's website regarding the CIP is not particularly

easy to find. To combat the lack of awareness, the city should consider engaging in active promotion of brownfield redevelopment through the use of convention-style showcases where properties, city departments, sellers and buyers can exchange information and get the word out to the development community. To the best of my knowledge, the literature has not addressed the effect of awareness of incentives on brownfield redevelopment. This finding, although not as impactful as some of the other results of this analysis, suggests that the issue of awareness does have a role to play in successful brownfield redevelopment campaigns.

6.4.3 The Role of Government

The interview analysis revealed that all participants from both the private and public sector were satisfied that the city has done its part in terms of creating an incentive package and funding. Nevertheless, for any brownfield redevelopment campaign to be successful, the local government has to be actively involved in the promotion and support of brownfield programs. This is especially so in cities like London, with limited financial resources, low demand, relatively slow real-estate markets, and an abundance of greenfield lands. The role of the local government is paramount. Some of the respondents believed that if the City of London wants brownfield to be successful then the City should be more active in the acquisition and remediation of sites. That is, the City should set out and purchase and remediate sites, thereby setting an example by displaying the viability of brownfield redevelopment. Other respondents, however, did not share this sentiment, claiming that the City is not in the development industry; rather, the City's role extends only as far as facilitating brownfield redevelopment, and it is the private sector that has the largest role to play in brownfield redevelopment. The city sets the stage and the

development community takes the initiative. However, if brownfield redevelopment is to gain popularity in London, the City should lead by example and actively engage in redevelopment in order to cultivate examples where brownfield redevelopment provides a viable option to development.

Sometimes the goals of the City and developers are at odds with each other. For example, one developer brought forth a proposal for an intended brownfield redevelopment project to the head of planning committee at the time. The head of planning committee responded that before the application could be approved, the opinions of the local residents would first need to be known. This example highlights the conflicting issues involved in the process. In this case, the developer could not understand why the city councillor took issue with the intended redevelopment since it was a project that incorporated elements that the city supported, such as high-density intensification. Conversely, the councillor had to come to a compromise between the demands of the community, the developer, and the goals of the city. These types of issues demonstrate that in order for a brownfield redevelopment campaign to be successful, municipalities need to prioritize where brownfield redevelopment fits into their policy agenda. London needs to target, in advance, exactly where they want redevelopment to occur.

Furthermore, in order to prompt brownfield redevelopment, the city needs to implement policy that makes it more difficult to develop greenfield sites, thus forcing developers to consider brownfields as a viable option. One participant believed that the role of the city should be to create a perfect balance of incentives that actually leads to a demand to develop brownfields. The city need not take an active role in development but make incentives work to a point where they create demand, ultimately resulting in developers bidding to take on brownfield redevelopments. However, this will not be

easily accomplished as the City has the difficult task of striking a balance between the practical realities of promoting economic growth and their goals for a sustainable future.

The respondents were also asked to comment on the roles of the federal and provincial governments in brownfield redevelopment. All the participants claimed that the Province of Ontario could be participating more in terms of direct funding and protection from liability. Because brownfield redevelopment is really an issue of national and provincial concern, and since these governments have much deeper pockets than cities do, they need to be creating financial incentives that would offset many of the costs of redevelopment. One public official pointed out that the federal, provincial and municipal governments need to coordinate their efforts to specifically target the brownfield issue. In a study that examined brownfield redevelopment efforts in Milwaukee, Wisconsin, De Sousa (2005) found that redevelopment campaigns are more successful in places where all levels of government parallel their efforts of implementing policy and injecting additional funds into brownfield redevelopment promotions. As long as each sector of the government is operating in isolation, the brownfield issue will face serious difficulties.

In the present study, most of the respondents were in agreement that the provincial government should take a more active role in direct funding. The basis for this argument lies in the fact that locally derived benefits in the form of increased tax revenues eventually make their way up to the province and finally to the federal government. Some public sector interviewees criticised the provincial government for their lack of direct funding. This is made apparent by the fact that the City of London offers five incentives and only one of them incorporates provincial funding. In one of the incentives in the CIP, the property tax program, the province will in some instances match the municipal

contribution with funds from the education tax. However, to apply for this, a completely separate and equally rigorous application has to be submitted by the city to the province.

It has already been established that concern for liability is a major deterrent to brownfield redevelopment, and that most developers would like to see more protection from liability. However, the City has no jurisdiction in this matter; liability is a provincial matter and both private and public sector participants believed the province needs to provide more legislation in terms of protection from liability which removes the fear component, thus allowing developers to engage in brownfield redevelopment with relative peace of mind.

6.5 Policy Implications

This research has shown that the issue of brownfield redevelopment is as complicated as it is extensive. In London, there are a number of barriers that must be addressed if successful redevelopment is to be achieved. In addition, a number of important sub-themes associated with brownfield redevelopment were identified from this study, among them, a need for a deeper understanding of brownfield sites relative to community conditions, comprehensive planning and better site marketing. Given the myriad of barriers, there is no single solution that would serve to remove the obstacles to brownfield redevelopment in London. Rather, an integrated comprehensive strategy that incorporates a host of initiatives from both the public and private sectors will be required.

The results of this study have indicated brownfield redevelopment in London is heavily linked to local market conditions, more specifically, demand for brownfield redevelopment. In addition, the financial incentives in the CIP will only be effective insofar as they create a demand for brownfield redevelopment. As useful as the financial

incentives may be, they are ineffective in creating demand and as a result cannot be considered effective mechanisms of promoting redevelopment since this demand is lacking in London.

Through its design, the London CIP focuses on eliminating environmental and economic blight in London and also assumes that the future social and financial benefits provided by redevelopment of brownfield sites will eventually outweigh the costs that incentives might incur. Despite the numerous stakeholders associated with brownfield redevelopment, the local government has assumed much of the responsibility for program implementation. However, more needs to be done to encourage brownfield redevelopment in London. Moreover, since the development industry is a profit driven industry, one cannot expect the development community to take the lead in brownfield redevelopment as many view it as unprofitable. As a result, it is the municipality which has the largest role to play if successful brownfield redevelopment is to be achieved. In addition, more emphasis needs to be placed on showcasing the benefits of brownfield redevelopment.

The absence of systematic studies on the impacts of brownfield redevelopment in London, and elsewhere in Canada, makes the implementation of monitoring systems that evaluate the effects of each redevelopment and the CIP necessary. This point further underlines the need to create an inventory of sites. All actors in the redevelopment process must be able to make decisions with full information regarding the costs and benefits of brownfield redevelopment. Since a detailed understanding of the public benefits and effects of brownfield redevelopment is currently missing in London, this may not be possible. Success will only be achieved if the community can be assured that the development is consistent with the economic and social needs of the residents and if

the developer is assured of a return on the investment. In order to stimulate more brownfield redevelopment, attention must be devoted to addressing the economic problems and fears faced by landowners, who are among the main actors in brownfield redevelopment, since it is their choice to bring the site into the marketplace. The CIP is effective in reducing some of the costs associated with brownfield redevelopment; however, the CIP as a whole have not been effective in inducing redevelopment. The existence of financial incentives does not assure redevelopment. Rather, the market will drive brownfield redevelopment through demand for redevelopment, which seems to be lacking in London.

Brownfield redevelopment can produce a multitude of benefits. However, these will not be realized unless the goals of brownfield redevelopment policy are embedded within a broader set of strategically planned agendas. For brownfield redevelopment projects to be successful, they need to be conceptualized in relation to broader patterns of development. Only by adopting a coordinated approach that looks at individual brownfield sites as they relate to the entire urban region will redevelopment be successfully sustainable (Raco & Henderson, 2006). London needs to move beyond a case-by-case approach and place brownfields in a large-scale undertaking that seeks to revitalize multiple properties across a wider area of the community. Thus, a multi-disciplinary approach must be employed to overcome the multiple hurdles. It was also discussed in Chapter 2 that brownfield redevelopments are based on the interplay between various interests, including developers and community, local and regional stakeholders, and different government agencies, and only through a balanced and coordinated planning process will redevelopment schemes be successful (Williams & Dair, 2007). It is clear from the results of the analysis that the City of London's role in brownfield

redevelopment is paramount. The City is charged with the difficult task of engaging local citizens, enticing the local development industry, and communicating the value of brownfields; they must create a common vision for an area in order to foster local support. By encouraging a shift in the perceptions of the public to see the benefits of utilizing brownfield sites, a demand for the reuse of these sites may be created. If there is a demand to utilize brownfield sites for the purposes of residential or commercial use, then the development community will thus shift its focus to meet this demand for brownfield sites.

The city needs to spearhead educational and awareness campaigns to better educate about the potential community benefits. Education, in general, will help to minimize some of the uncertainties that accompany the development of brownfields. Emphasis on education and the publicizing of information regarding the suite of incentives should be increased. This can be achieved by organizing yearly brownfield conventions where representatives from the city, the province, the development community, the real-estate industry, environmental engineers and the public can meet to exchange information and establish networks to encourage an open dialogue among the many actors involved in the issue. Moreover, stakeholders from outside London can be invited to discuss their experiences and success with brownfield redevelopment in other cities.

According to Meyer & Lyons (2000) policy cannot address the lack of expertise and experience in brownfield redevelopment. However, in cities where there is a growing popularity to live in urban areas rather than in suburban areas, the residential demand for urban locations is increased. Therefore in order to truly create a demand for brownfield redevelopment in the inner city, the City of London needs to promote the attractiveness of

urban residency. Through a combination of policy initiatives and development campaigns, the allure of suburban locations needs to be limited while simultaneously highlighting the attractiveness of urban living through significant investment in reurbanization. By investing in the infrastructure of the inner city, retail trade and service oriented business may be more inclined to locate in these areas. In this way, a demand for downtown living may be generated. Once the issue of demand is addressed, the development industry will follow suit and provide opportunities for this type of living.

In addition, the encouragement of policy that requires investment in infrastructure improvements in the areas where brownfields are located to attract developers should be considered as well. The capability of the existing local infrastructure is important because it may entice developers to see the potential of sites located in an area well embedded within the urban fabric. It is recognized that some developments will place more demands on the infrastructure than other developments, but local officials should invest in improvements in order to begin to engage potential developers.

One unexpected outcome of this study was the emphasis that urban sprawl and the general population's tendency to live in suburban areas play in the hindrance of brownfield redevelopment. During the last two decades of the 20th Century, London's inner core experienced a process of deurbanization characterized by the abandonment of the inner city and a retreat to the suburbs resulting in a lack of downtown investment, declining levels of property maintenance, and the closure of businesses (Downtown Revitalization, 2009). This process was outlined in Chapter 2 and helped explain the rise of brownfields in post-industrial cities. To combat this, the City of London implemented principles of smart growth and compact development in its planning mandate. However, it was noted in Chapter 2 that a major challenge facing smart growth is the extent to

which current growth patterns can be transformed in an atmosphere where administrations, consumers, developers and economic systems favour sprawl (Filion, 2003). The results of this indicate that, to a large extent, sprawl and greenfield redevelopment are favoured over brownfield redevelopment. It was discussed in Chapter 2 that the population's retreat to suburban jurisdictions helped explain the existence of brownfield sites in cities; it seems ironic that one of the contributory factors to the rise of brownfields (sprawl) is now one of the greatest barriers to brownfield redevelopment. Policies that serve to restrict greenfield development can also motivate potential developers to look to brownfield sites as a viable option. The City of London does currently have an urban growth boundary in place. However, to limit the amount of urban sprawl, this boundary needs to be substantially constricted as it is currently too expansive to force infill development. Moreover, the City must increase development charges in these areas to force intensification in the inner city. In addition, it is recommended that the City lead by example; by actively involving themselves in the acquisition and remediation of brownfield sites across the city, developers may begin to see the potential profits and benefits of brownfield redevelopment.

Under the CIP, funds spent on remediation are incurred by the remediator prior to receiving any financial relief from the incentives. These upfront costs are a major deterrent to redevelopment and even serve to discourage consideration of redevelopment. To provide additional motivation, the developers should be allowed to deduct these upfront expenses from their income tax thus, giving them an added incentive prior to redevelopment.

Liability is considered another major hindrance to redevelopment. However, the City has no jurisdiction in this matter. Indeed, the provincial governments should also

establish legislation that provides clear protection from liability. Once a site has been remediated, liability should become a non-issue. That is, once an owner has remediated a site, that owner should be free of any future concerns of liability. Once remediated and an RSC filed, it should be the responsibility of the current owner to be liable for any future remediation. By removing the risk of liability, a major hurdle in the redevelopment process is removed.

The brownfield redevelopment program originates at the provincial level with the Ministry of Environment, which views brownfield redevelopment as an opportunity to clean up contamination; whereas London and other municipalities implement brownfield redevelopment programs to induce economic activity. This gap needs to be addressed. All levels of government need to cooperate to develop and implement an integrated strategic redevelopment program. The easier it is for property owners and developers to receive necessary approvals, the more attractive a brownfield becomes for redevelopment.

The creation of a municipal task force charged with the purpose of streamlining and standardising the redevelopment application process is imperative. In this way, municipalities can ensure the process is simplified, thus reducing the time component and clarifying any misunderstandings and complications. This group would receive all brownfield proposals and assess the merits of each application relative to the broader community goals and planning principles. The existence of such a task force would eliminate the bureaucratic process of having the application circulated to various departments at city hall. This group would make sure public funds are not spent on sites that are likely candidates for private action; that is, sites that do not require public intervention. Rather, government funding should be focused on promoting the redevelopment of the least marketable sites in ways that meet the needs of the community

in which the site is located. Eligibility criteria should be designed in a way that reduces the likelihood that public funds go to sites where intervention may not be necessary. Government funds should be directed to sites where demand for redevelopment is low.

Finally, The London Brownfield CIP stipulates that each application will be reviewed based upon its contributions to the greater good of the City, and in this way only the largest and most contaminated sites will likely be developed. The implicit logic here is that little will be done for smaller, more scattered sites such as abandoned automobile service stations, machine shops, dry-cleaners and fuel stations. These abandoned smaller sites provide opportunities for local entrepreneurs to re-invest in their neighbourhoods. Consequently rather than funnelling funds into the larger more contaminated sites, the City of London should consider providing funding to these smaller locations through strategic neighbourhood revitalization campaigns. To be successful, the City would be required to work more closely with local communities, entrepreneurs and economic development organizations. Significantly more public resources may be needed for the assessment, cleanup and redevelopment of these properties around the city. Still, unless the City's administration knows where and how many sites there are in a particular neighbourhood, such campaigns will be unsuccessful. This argument outlines the need for London to determine where these smaller sites are located, so that strategic action plans can be properly implemented.

6.6 Conclusion

This research examined London's experience with brownfield redevelopment and incorporated the perspectives of both the public and the private sector. It has clearly shown that the issue of brownfield redevelopment is contentious and involves a myriad of

factors and actors. Research on the Canadian experience with brownfields is rather limited and there have been no in-depth studies focusing solely on London's, or any other midsized Canadian city's experience with brownfield redevelopment. This study adds to the growing body of work detailing the Canadian experience with brownfields. More specifically, it contributes to a large body of work that seeks to assess the role of policy, financial incentives and the role of the public and private sectors in the redevelopment of brownfield sites. In addition, because this examination was based in London, a typical midsized Canadian city, the results here may be applied to other cities with similar characteristics. This body of work is also the only study, to date, that effectively integrates both the public and private sector's perceptions regarding brownfield redevelopment in Canada. Moreover, there have been no attempts to detail a truly comprehensive and universal method to inventory brownfield sites, and this thesis has presented an efficient method to do so.

That being said, there are some limitations to this particular study that should be addressed. The fact that the London Brownfield CIP was only two years old when this study began limited the depth and scope of the analysis. The infancy of the CIP meant that the City of London and the development community had only a limited experience with brownfield redevelopment and the incentives offered in the CIP. As a result, the effectiveness of the incentives could not truly be measured. Another limitation of this analysis was the relatively small sample size. This factor was due to participants' unwillingness to participate in the study, the sensitive nature of the topic, the infancy of the CIP, and London's relative inexperience with brownfield redevelopment.

In spite of the contributions of this study, the results indicate that there are many opportunities for future research in the field of brownfield redevelopment in London.

There is much more to learn about the perspectives of those involved in brownfield redevelopment in London and in Canada. To compensate for the place-specificity of this study, I recommend replicating this study in other municipalities across Ontario and Canada in order to determine if the issues in this study are occurring in other places. This will allow for the development of a general theory regarding brownfield redevelopment in Canada. Because the CIP is in its infancy, it is recommended that this study be replicated again to determine the effectiveness of the financial incentives in promoting brownfield redevelopment in London. As time progresses, the incentives in the CIP will likely increase in use and thus so will the potential sample pool of development community with direct experience with the CIP. As a result, a study detailing the experiences of the private sector in London will be able to gauge the effectiveness of the incentives more efficiently. It is also recommended that two additional studies be administered: 1) a study focusing primarily on the private sector's perspectives and its willingness to participate in brownfield redevelopment in London; and 2) another city-wide study in the form of a survey to determine what proportion of London's population would be willing to live in redevelopment brownfields. Such a study would be useful in determining the level of demand and would most certainly contribute to the effectiveness of future brownfield policy in London. This Chapter has discussed that in order to target specific areas of London for development, the number of potentially convertible sites in an area must be known. Consequently, it is strongly recommended that a comprehensive database of brownfield sites be compiled using the methods detailed in Chapter 3; such an inventory would greatly assist in city-wide redevelopment efforts.

References

Adams, D., Disberry, A., Hutchison, N., & Munjoma, T. (2000). Mind the gap! Taxes, subsidies and the behaviour of brownfield owners. *Land Use Policy*, 17, pp. 135-145.

Alberini, A., Longo, A., Tonin, S., Trombetta, F. & Turvani, M. (2005). The role of liability, regulation and economic incentives in brownfield remediation and redevelopment: evidence from surveys of developers. *Regional Science and Urban Economics,* 35, pp. 327-352.

Alker S. & McDonald A. (2003). Incorporating sustainable development into redevelopment. *Sustainable Development* 11, pp. 171-182

Alker, S., Joy, V., Roberts, P. & Smith, N. (2000). The definition of brownfield. *Journal of Environmental Planning and Management,* 43 (1), pp. 49-69.

Alonso, W. (1960). A theory of the urban land market. *Papers and Proceedings of the Regional Science Association* 6, pp. 149-158

Anas, A. (1992). On the birth and growth of cities: Laissez-faire and planned compared. *Regional Science and Economics,* 22, pp. 243-258.

Behan, K., Maoh, H. & Kanaroglou, P. (2008). Smart growth strategies, transportation and urban sprawl: simulated futures for Hamilton, Ontario. *The Canadian Geographer,* 52 (3), pp 291-308.

Bliek, D. & Gauthier, P. (2007). Mobilising urban heritage to counter the commodification of brownfield landscapes: Lessons from Montreal's Lachine Canal. *Canadian Journal of Urban Research,* 16 (1), pp. 39-58.

Bloomfield, G.T. (1982). Canadian fire insurance plans and industrial archaeology, *Journal of the Society for Industrial Archaeology*, 8(1), pp. 67-80.

Boal, F.W. (1976). Ethnic residential segregation. In Herbert, D.T. & Johnston, R.J. (Eds.), *Socail Areas in Cities, Vol. 1.* John Wiley & Sons: London.

Bourne, L. (1981). *The Geography of Housing*. Edward Arnold Ltd: London.

Bugliarello, G. (2006). Urban sustainability: Dilemmas, challenges and paradigms. *Technology in Science,* 28, pp. 19-26.

Bunce, S. (2004). The emergence of smart growth intensification in Toronto: environment and economy and the new official plan. *Local Environment,* 9 (2), pp. 177-191.

Carter, K. & Fortune, C. (2007). Sustainable development policy perceptions and practice in the UK social housing sector. *Construction Management and Economics* 25, pp. 399-408.

Chan, E. & Lee, G.K.L. (2008). Critical factors for improving social sustainability of urban renewal projects. *Soc Indic Res,* 85, pp. 243-256

Charmaz, K. (2004). "Grounded theory", in Nagy Hess-Biber, S. and Leavy, P.(Eds.) *Approaches to Qualitative Research: A Reader on Theory and Practice*, New York: Oxford University Press, pp 496-521.

City of Guelph. (2002). *Brownfields Strategy*. Retrieved, June 17, 2008 from: http://guelph.ca/uploads/PBS_Dept/planning/documents/Brownfields/CIPUpdated 2008.pdf

City of Kingston. (2006). City *of Kingston Community Improvement Plan, Brownfields Project.* Retrieved June 17, 2009 from: http://www.cityofkingston.ca/pdf/environment/brownfields/BrownfieldsCIP-Final.pdf

City of London, Department of Planning and Development. (2006) *City of London Community Improvement Plan for brownfield Incentives*. Retrieved January 20, 2008 from: http://www.london.ca/d.aspx?s=/Planning/brownfields.htm

DeBats, D.A. (2008). A tale of two cities: Using tax records to develop GIS files for mapping and understanding nineteenth-century U.S. cities. *Historical Methods,* 41 (1), pp. 17-38.

DETR (Department of Environment, Transport and the Regions) (1999) *A better quality of life: strategy for sustainable development for the United Kingdon.* DETR, London.

de Shiller, S. (2004). Supporting sustainability issues in urban transformation. *Urban Design,* 9, pp. 53-60.

De Sousa, C. (2000). Brownfield redevelopment versus greenfield redevelopment: A private sector perspective on the costs and risks associated with brownfield redevelopment in the Greater Toronto Area. *Journal of Environmental Planning and Management,* 43 (6), pp. 831-853.

De Sousa, C. A. (2003). Turning brownfields into green space in the City of Toronto. *Landscape and Urban Planning* 62, pp. 181–198

De Sousa, C. (2005). Policy performance and brownfield redevelopment in Milwaukee, Wisconsin. *The Professional Geographer,* 57 (2), pp. 312-327.

De Sousa, C. A. (2006a). Urban brownfields redevelopment in Canada: the role of local government. *Canadian geographer,* 50 (3), pp. 392-407.

De Sousa, C. A. (2006b). Unearthing the benefits of brownfield to green space projects: An examination of project use and quality of life impacts. *Local Environment,* 11 (5), pp. 577-600.

Dickenson, P. & Lloyd, P.E. (1990). *Locations in Space: Theoretical Perspectives in Economic Geography, 3rd ed.* Harper & Row Publishers, Inc: New York.

Dixon, T. (2006). Integrating sustainability into brownfield regeneration: Rhetoric or reality? – An analysis of the UK development industry. *Journal of Property Research* 23 (3), pp. 237-267

Dixon, T. (2007). The property development industry and sustainable urban brownfield regeneration in England: An analysis of case studies in Thames Gateway and Greater Manchester. *Urban Studies*, 44 (12), pp. 2379-2400.

Dixon, T. & Adams, D. (2008). Housing supply and brownfield regeneration in a post-Barker World: Is there enough brownfield land England and Scotland? *Urban Studies* 45 (1), pp. 115-139.

Downtown Revitalization (2009). *Financial Incentives for Revitalization and Redevelopment in the Downtown.* Retrieved, August, 21, 2009, from: http://www.london.ca/d.aspx?s=/Economic_Development/downtownrevit.htm

Dubreuil, L., & Woods, C. A. (2002). *Catalogue of Canadian Fire Insurance Plans 1875-1975.* Occasional Papers no. 6 (Ottawa: Association of Canadian Map Libraries *1976.* and Archives).

Dwyer, C & Limb, M. (2001). *Qualitative Methodologies for Geographers.* Oxford University Press: New York

Ellerbusch, F. (2006). Brownfields: Risk, property and community value. *Local Environment,* 11 (5), pp. 559-575

Esterberg, K. (2001). Qualitative Methods in Social Research. McGraw Hill: USA

Fendt, J. & Sachs, W. (2007). Grounded theory method in management research. *Organizational Research Methods,* 20 (10), pp. 1-25.

Filion, P. (2003). Towards smart growth? The difficult implementation of alternatives to urban dispersion. *Canadian Journal of Urban Research, 12 (1),* pp. 48-70.

Filion, P. & McSpurren, K. (2007). Smart growth and development reality: The difficult co-ordination of land-use and transport objectives. *Urban Studies,* 44 (3), pp. 501-523.

Franz, M., Gules, O. & Prey, G. (2008). Place-making and 'green' reuses of brownfields in the Ruhr. *Tijdschrift voor Economische en Sociale Geografie,* 99 (3), pp. 316-328.

Frickel, S. & Elliot, J.R. (2008). Tracking industrial land use conversions: A new approach for studying relict waste and urban development. *Organization & Environment,* 21 (2), pp. 128-147.

Garreau, J. (1991). *Edge City: Life on the New Frontier. Doubleday:* New York.

Geisinger, A. (1999). Sustainable development and the domination of nature: Spreading the seed of the western ideology of nature. *Environmental Affairs law Review,* 27(1), pp 43–74.

Gilliland, J. (2002). The creative destruction of Montreal: Street widenings and urban (re)development in the nineteenth century. *Urban History Review 31 (2002)*: pp. 37-51.

Gilliland, J. A. & Novak, M. (2006). Positioning the past with the present: The use of fire insurance plans and GIS for urban environmental history. *Environmental History,* 11 (1), pp. 136-139.

Government of Ontario. (2001). *Brownfields Statute Law Amendment Act.* Retrieved June 17, 2009 from: http://www.e-laws.gov.on.ca/html/source/statutes/english/2001/elaws_src_s01017_e.htm

Government of Ontario. (1990). *The Planning Act.* Retrieved June 17, 2009 from: laws.gov.on.ca/html/statutes/english/elaws_statutes_90p13_e.htm

Government of Ontario (2005). *Places to grow, better choices, brighter future : Draft growth plan for the Greater Golden Horseshoe.* Retrieved, June 17, 2009 from Ontario. http://www.placestogrow.ca/images/pdfs/FPLAN-ENG-WEB-ALL.pdf

Greenberg, M., Craighill, P, Mayer, H., Zukin, C. & Wells, J. (2001a). Brownfield redevelopment and affordable housing: A case study of New Jersey. *Housing Policy Debate* 12 (3), pp. 515-540.

Greenberg, M., Lowrie, K., Mayer, H., Miller, K.T. & Solitare, L. (2001b). Brownfield redevelopment as a smart growth option in the United States. *The Environmentalist*, 21, pp. 129–143.

Gute, D.M. & Taylor, M. (2006). Revitalizing neighbourhoods through sustainable brownfields redevelopment: Principles put into practice in Brideport, CT. *Local Environment,* 11 (5), pp. 537-558.

Hamilton Economic Development Office. (2007). Brownfields ERASE Program. Retrieved, June, 17, 2009, from: http://www.investinhamilton.ca/brownfieldseraseprogram.asp#TOP

Harris, R. (1997). "Reading Sanborns for the Spoor of the Owner-Builder, 1890s-1950s," in: *Exploring Everyday Landscapes: Perspectives in Vernacular Architecture VII*, (eds.) Annmarie Adams & Sally McMurry (Knoxville: University of Tennessee Press), pp. 251-67.

Harris, R. & Moffat, B. (1986). How reliable is the modern city directory? *The Canadian Geographer,* 30 (2), pp. 154-8.

Harvey, D. (1989). *The Urban Experience.* John Hopkins University Press: Baltmore

Herbele, L. & Wernstedt, K. (2006). Understanding brownfields regeneration in the US. *Local Environment, 11 (5),* pp. 479-497.

Holdsworth, D. (1992). "Morphological Change in Lower Manhattan, New York, 1893-1920," in: *Urban Landscapes: International Perspectives,* (eds.) J.W.R. Whitehand & P.J. Larkham (London: Routledge), pp. 114-29.

Jabareen, Y. (2008). A new conceptual framework for sustainable development. *Environ Dev Sustain* 10, pp. 179-192.

Knigge, L. and Cope, M. (2006). Grounded visualization: integrating the analysis of qualitative and quantitative data through grounded theory and visualization. *Environment and Planning A,* 38, pp. 2021-2037.

Lange, D.A. & McNeil, S. (2004). Brownfield development: Tools for stewardship. *Journal of Urban Planning and Development, 130 (2),* pp. 109-116.

Lo, C.P. & Yeung, A.K.W. (2002). *Concepts and techniques of geographic information systems.* New York: Prentice Hill, pp. 140-144.

Mayer, H. J., Danis, C. M. & Greenberg, M. R. (2002). Smart growth in a small urban setting: the challenges of building an acceptable solution. *Local Environment,* 7 (4), pp. 349-362.

McCarthy, L. (2002). The brownfield dual land-use policy challenge: reducing barriers to private sector redevelopment while connecting reuse to broader community goals. *Land Use Policy,* 19, pp. 287-296

Meyer, P & Lyons, T. S. (2000). Lessons from the private sector brownfield redevelopers. *Journal of the American Planning Association,* 66 (1), pp. 46-57.

Ministry of Municipal Affairs and Housing. (2007). *A practical Guide to Brownfield Redevelopment in Ontario.* Retrieved February 15, 2008, from: http://www.mah.gov.on.ca/AssetFactory.aspx?did=4995

Ministry of the Environment. (2004). Records of Site Condition. Queens Printer for Onario: Ontario, CanadaMoulder, C. (1993) Fire insurance plans as a data source in urban research: An annotated bibliography of examples, *Arts Reference Services Quarterly,* 1(3), pp. 49-62.

Moore, N.M. (2002). From indigenous industry to foreign finance: the changing face of Dublin Docklands. *Land Use Policy* 19, pp. 325-331

National Round Table on the Environment and Economy (NRTEE). (1997) *Improving site specific data on the environmental condition on land.* Ottawa: NRTEE.

National Round Table on the Environment and Economy (NRTEE). (2003). *Cleaning up the Past, Building the Future: A National Brownfield Redevelopment Strategy for Canada.* Ottawa: NRTEE.

Naess, P. (2001). Urban planning and sustainable development. *European Planning Studies,* 9 (4), pp. 503-524.

Nijkamp, P., Rodenburg, C.A., & Wagtendonk, A.J. (2002). Success factors for sustainable urban brownfield development: A comparative case study approach to polluted sites. *Ecological Economics* 40, pp. 235-252.

Novak, M. (2006). *Fire and urban morphology: A spatio-temporal analysis of destruction and reconstruction in early-twentieth century London, Ontario.* Unpublished M.A. Thesis, Faculty of Graduate Studies, The University of Western Ontario.

Page, G.W. & Berger, R.S. (2006). Characteristics and land use of contaminated brownfield properties in voluntary cleanup agreement programs. *Land Use Policy,* 23, pp. 551-559.

Park, R.E., Burgess, E.W. & McKenzie, R.D. (1925). *The City.* The University of Chicago Press: Chicago

Pryce, G. (2003). Greening by the market? Distortions caused by fiscal incentives to build on brownfield land. *Housing Studies,* 18 (4), pp. 563-585

Raco, M. & Henderson, S. (2006). Sustainable urban planning and the brownfield development process in the United Kingdom: Lessons from the Thames Gateway. *Local Environment,* 11 (5), pp. 499-513.

Roseland, M. (2000). Sustainable community development: integrating environmental, economic, and social objectives. *Progress in Planning* 54, pp. 73-132.

Rowley, G. (1984) *British Fire Insurance Plans* (London, C.E. Goad).

Simons, R.A. & El Jaouhari, A. (2001). Local government intervention in the brownfields arena. *Economic Development Commentary,* 25 (3), pp. 12-18.

Solitare, L. (2005). Prerequisite conditions for meaningful participation in brownfields redevelopment. *Journal of Environmental Planning and Management, 48 (6),* pp. 917-935.

Song, Y. (2005). Smart growth and urban development pattern: A comparative study. *International Regional Science Review,* 28 (2) pp. 239-265.

Statistics Canada. Community Profile: *London Ontario CMA* [Data File]. Retrieved July 13, 2009 from http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/details/page.cfm?Lang=E&Geo1=CMA&Code1=555__&Geo2=PR&Code2=35&Data=Count&SearchText=London&SearchType=Begins&SearchPR=01&B1=All&Custom=

Storper, M. & Scott, A.J. (Eds.) (1992). *Pathways to Industrialization and Regional Development.* Routledge: London.

Talen, E. (2003). Measuring urbanism: Issues in smart growth research. *Journal of Urban Design,* 8 (3), pp. 195-215

Tebeau, M. (1997). "Re-imagining the Urban Landscape: Fire Risk and Insurance in Nineteenth-Century St. Louis," in: *Common Fields: An Environmental History of St. Louis,* (ed.) Andrew Hurley (St. Louis: Missouri Historical Society Press), 143.

The Coroporation of the City of Brantford. (2005). *Brownfields Sites Community Improvement Plan.* Retrieved, June 17, 2009, from: http://www.city.brantford.on.ca/content/publishing.nsf/Content/Incentive+Program%282006%29+Community+Improvement+Plan/$file/CommunityImprovemenPlan2006.pdf

Tunbridge, J.E. (1986). Warehouse functions, insurance plans and inner-city revitalization: A Canadian research note, *The Canadian Geographer,* 30(2), pp. 146-154.

US EPA (2008). Brownfields and Land Revitalization: Brownfield Defintion. Retrieved December 20, 2008, from http://www.epa.gov/brownfields/glossary.htm

Vance, J.E. (1990). *The Continuing City.* John Hopkins University Press: Baltimore.

Wedding, C.G. & Crawford-Brown, D. (2007). Measuring site-level success in brownfield redevelopments: A focus on sustainability and green building. *Journal of Environmental Management,* 85, pp. 483-495.

Wernstedt, K., Meyer, P.B., Alberini, A., & Heberle, L. (2006). Incentives for private residential brownfields development in US urban areas. *Journal of Environmental Planning and Management,* 49 (1), pp. 101-119.

Williams, K & Dair, C. (2007). A framework for assessing the sustainability of brownfield developments. *Journal of Environmental Planning and Management*, 50 (1), pp. 23-40.

INFORMATION & CONSENT DOCUMENTATION

Remediating barriers to brownfield redevelopment in the city of London, Ontario

To Whom It May Concern:

I am a Masters student in the Department of Geography at The University of Western Ontario and I am conducting a study aimed at highlighting success factors involved in brownfield redevelopment in the City of London, Ontario.

The purpose of this letter is to invite you to partake in this study and to provide you with the information you require to make an informed decision on participating in this research.

The purpose of this study is to analyse the balance of forces governing the issue of brownfield redevelopment in the hope of identifying particular barriers to successful redevelopment. The main objective of this study is to highlight the obstacles involved in remediating potentially contaminated urban brownfield sites and converting them into liveable/workable spaces.

Should you decide to partake in this study, I will arrange to come and interview you at your home, place of work or any other public or private space most convenient to you on a range of topics focusing on your perceptions as they relate to brownfield redevelopment. The interviews will take approximately one hour to complete. The interview will be audio taped and transcribed into written format. The interviews will take place at any location that is convenient to you.

Participation:

- Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time. If you are already participating in another study at this time, please inform the interviewer right away to determine if it is appropriate for you to participate in this study.

Confidentiality:

- Confidentiality and anonymity will be carefully guarded. Identifiable data will be coded in the following manner: Names and other identifiable information will not be used in this study; only information pertaining to what stakeholder group the participant belongs to will be used. All direct quotes will be completely anonymous.

- Research records (computer discs, transcripts, questionnaires, audio tapes and notes) will be stored in the following manner: locked in a cabinet in the co-

investigator: Michael Hayek's office; audio tapes will be listened to only by the co-investigator. Digital data will be stored on the co-investigator's personal laptop; the laptop requires a password and as such is secure. All written and audio records will be destroyed after two years. If the results of the study are published, names will not be used and no information that discloses the participants' identities will be released or published without specific consent of the participant. All written records will be shredded, all discs will be broken in half and all digital data will be deleted. No agencies other than the research team (Lead investigator: Dr. Godwin Arku and co-investigator: Michael Hayek) will have access to any data collected for this study.

- If the results of the study are published, your name will not be used and no information that discloses your identity will be released or published without your specific consent to the disclosure.

Contact persons:

- If you have any questions about this study please contact Michael Hayek at
  or Dr. Godwin Arku at

- If you have questions about your rights as a research subject you may contact:

  Director of the Office of Research Ethics
  The University of Western Ontario
  (519)-661-3036

Other pertinent information:

- You will not be compensated for your participation in this research study.
- You do not waive any legal rights by signing the consent form.
- If the results of the study are published, your name will not be used. If you would like to receive a copy of the overall results of this study please put your name and address on a blank piece of paper (separate from the questionnaire) and give it to the interviewer.

Thank you for your consideration in participating in this study,

Sincerely,

Michael Hayek
Graduate Student
Department of Geography
University of Western Ontario

CONSENT STATEMENT

I have read the Letter of Information (or Information/Consent document), have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

Research Participant:

Name .....

Signature .....

Date .....

Interviewer obtaining informed consent

Name .....

Signature .....

Date .....

Interview Guide-Public Sector:

Topic	Question	Probe
1) The City of London's Experience in Brownfield Redevelopment	Since when has the City of London been involved in brownfield redevelopment? Can you describe the evolution of the City of London's involvement in brownfield redevelopment over the last few years? How important do you think brownfield redevelopment is on the City's development policy agenda within the scheme of urban growth management?	
(2) Obstacles faced in getting brownfields redeveloped	What do you perceive to be the barriers to brownfield redevelopment in London? Do you see any obstacles stemming from the organizational structure of the City's various departments that might impede brownfield redevelopment?	
(3) Effectiveness of municipal policies and programmes	From your experience, are the financial incentives provided by the city of London effective in promoting brownfield redevelopment? Is there anything else the City of London can do, besides the programs already in place, to promote brownfield redevelopment in London?	Where does the money come from?

	So, far how much how much money has been spent on the redevelopment of brownfield sites?	
(4) Benefits of brownfield redevelopment	What does the City of London believe to be the greatest benefit of brownfield redevelopment? In other words, why is the City of London interested in getting brownfields redeveloped?	
(5) The role of governmental and non-governmental stakeholders in facilitating redevelopment	How much of a role should the municipal government play in facilitating brownfield redevelopment? How much of a role should the provincial government play in facilitating brownfield redevelopment? How much of a role do should the federal government should play in facilitating brownfield redevelopment? How much of a role should that private stakeholders play in the facilitating brownfield redevelopment?	
Supplementary questions:	Does the city think that developers are more likely to develop brownfields or greenfield sites? From your experience, what is the preference of developers (Gf or bf)? So far how much has been spent on a yearly basis?	

	So far, how many developers have been involved in redeveloping bfs? So far, how many sites have been redeveloped?	
Amount of Brownfields	1) Do you know how many bfs are in london? 2) Do you think it is important to know how many bfs are in London?	

Interview Guide-Private Sector:

Topic	Question	Probe
1)Introductory question	• What type of development does you company primarily engage in?	
2) Experience with brownfield redevelopment	• Does your company have any experience in the redevelopment of brownfields in London (or elsewhere)? • What kind(s) of redevelopment has your company undertaken so far?	- How long has your company been engaged in the redevelopment of brownfields? --- - Was it a commercial redevelopment? - Was it a residential redevelopment? - Was it an industrial redevelopment?
3) Experience with the City of London's Brownfield Incentives	• Are you aware that the City of London offers incentives to redevelop brownfield sites? • Have you ever tapped into any of the city's incentive program? If yes, which? • From your experience, can you comment on the effectiveness of the various incentives that you utilized?	How did you hear about the various incentives offered by the City of London? **Reminder:** (i) Contamination Assessment Grant; (ii) Property Tax Assistance Program; (iii) Development Charge Rebate; (iv) Tax Increment Equivalent Program; (iv) Green Municipal Fund - Did your company undertake brownfield redevelopment because of the city's financial incentives? --- • What did you like about the incentives that you employed? • What didn't you like about the incentives you employed? • Will you utilize it again?
4) The effectiveness of	• From your	

municipal and provincial policies and programmes	experience, how effective are municipal incentives in promoting the redevelopment of brownfield sites in London? • In your opinion what should be the role of the municipal government (i.e. London) in managing brownfield sites? • Why do you think the city is interested in getting brownfields sites redeveloped?	-Is there anything beyond financial incentives that the city should be doing to promote brownfield redevelopment? Advertising? Protection from legal liability? Marketing?
5) Motivating factors for brownfield redevelopment	• What do you believe to be your greatest motivator of redeveloping brownfield sites? • What else would motivate you to redevelop a brownfield site?	
6) Benefits of developing brownfield sites	• What do you believe to be single most important benefit of redeveloping brownfield sites • What other benefits do see occurring from brownfield redevelopment?	
7) Shortcomings and barriers of redeveloping brownfield sites	• Do you see any disadvantages of developing brownfield sites in	

	London? • From your experience, what is the greatest barrier to redeveloping brownfield sites in London (or elsewhere? • What other barriers do you see as impeding the redevelopment of brownfield sites in London?	(e.g. slow approval process, administrative cost, liability issues, fear of risk, lack of suitable clean up technology, neighbourhood stigma, etc)
8) Barriers to Brownfield Redevelopment	• How do you feel about the fact that the City of London only provides financial incentives to sites that have been proven to be contaminated? • Is there anything about the qualification criteria of the incentives that may hinder brownfield redevelopment?	• Should the City of London be financially responsible for Phase I ESAs - So in general, why do you think developers in London are not taking advantage of the city's incentives package to redevelop brownfield sites?
Amount of Brownfields	1) Do you know how many bfs are in London? 2) Do you think it is important to know how many bfs are in London?	
Concluding comments	Are there any final comments you wish to add to the issues we have discussed today?	

Ethics Approval

Office of Research Ethics
The University of Western Ontario
Room 00045 Dental Sciences Building, London, ON, Canada N6A 5C1
Telephone: (519) 661-3036 Fax: (519) 850-2466 Email: ethics@uwo.ca
Website: www.uwo.ca/research/ethics

Use of Human Subjects - Ethics Approval Notice

Principal Investigator: Dr. G. Arku
Review Number: 15054S **Review Level:** Full Board
Review Date: April 4, 2008

Protocol Title: Brownfield redevelopment in London: An examination of scale, policy initiatives and impacts on urban form.

Department and Institution: Geography, University of Western Ontario
Sponsor: ADF Small Grant - UWO
Ethics Approval Date: April 30, 2008 **Expiry Date:** August 31, 2008
Documents Reviewed and Approved: UWO Protocol, Letter of Information and Consent
Documents Received for Information:

This is to notify you that The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the applicable laws and regulations of Ontario has granted approval to the above named research study on the approval date noted above.

This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the NMREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the UWO Updated Approval Request Form.

During the course of the research, no deviations from, or changes to, the study or consent form may be initiated without prior written approval from the NMREB except when necessary to eliminate immediate hazards to the subject or when the change(s) involve only logistical or administrative aspects of the study (e.g. change of monitor, telephone number). Expedited review of minor change(s) in ongoing studies will be considered. Subjects must receive a copy of the signed information/consent documentation.

Investigators must promptly also report to the NMREB:

a) changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
b) all adverse and unexpected experiences or events that are both serious and unexpected;
c) new information that may adversely affect the safety of the subjects or the conduct of the study.

If these changes/adverse events require a change to the information/consent documentation, and/or recruitment advertisement, the newly revised information/consent documentation, and/or advertisement, must be submitted to this office for approval.

Members of the NMREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the NMREB.

Chair of NMREB: Dr. Jerry Paquette

Ethics Officer to Contact for Further Information			
☑ Grace Kelly	☐ Janice Sutherland	☐ Jennifer McEwen	☐ Denise Grafton

This is an official document. Please retain the original in your files.

cc: ORE File