

NEXT DOOR TO THE FACTORY

Housing People in Modern

Industrial Parks

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This project was carried out with the assistance of a grant from Canada Mortgage and Housing Corporation under the terms of the External Research Program (CMHC CR File 6585-G064-1). The views expressed are those of the authors and do not represent the official views of the Corporation.

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ABSTRACT

The study considers the suitability of housing people in modern industrial parks. Proceeding from the assumption that increasing urban density improves urban efficiency, the research investigates the option of congregating residential uses near job centres in clean industrial areas. A case study of Burnside Industrial Park, the largest industrial area in the Maritimes, illustrates some of the opportunities and constraints discovered.

With good design, planners can congregate residential uses with industry. The case study indicates, however, that risks from traffic, noise, odours, and hazardous materials make industrial areas unsafe for many potential residents. While able-bodied adult households with members working in the industrial park could find the area appropriate, other types of households would not meet their needs in the park. Residents' interests in moving into industrial areas will depend upon their present commuting time, the quality of housing available in the industrial area, and the options available elsewhere in the community. In the case study context, people have too many attractive housing choices in the community to make industrial areas attractive. Larger communities where people commute long distances to affordable housing may find that industrial areas seem suitable to potential residents.

Despite the findings of the case study, the authors conclude that infilling residential uses in clean industrial areas may prove a suitable option for some communities. Communities interested in pursuing the option need to adopt regulatory mechanisms that allow flexibility to adapt to new circumstances. Overlay zones, special districts, conditional use permits, and performance zoning provide tools for redeveloping portions of the urban environment. Communities that plan for re-use will avoid finding themselves with outdated assets. The authors also suggest that communities promote the use of mobile units and modular construction (for quick assembly). We will need to plan for adaptive re-use of facilities and co-use of spaces in the rapidly changing economic climate of the 21st century. Companies and communities that can adjust quickly to new market requirements and opportunities will prove more viable.

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Housing People in Modern Industrial Parks

SUMMARY

In recent years, several communities have revised planning regulations to encourage greater housing densities in built-up areas. Infilling new households in developed areas makes optimum use of infrastructure (such as roads and sewers) and facilities (such as schools and hospitals). Without extending urban boundaries a community can provide additional housing units to accommodate population growth or household formation. "Retrofitting" the suburbs and "reurbanizing" the urban core have become planning buzzwords in the early 1990s.

Despite the interest in residential intensification, few researchers have considered the potential for developing housing **within** one of the major employment centres in our communities: the industrial park. Industrial design criteria typically create infrastructure which sits under-utilized for 12-16 hours per day. Given the nature of modern industrial parks, we can make a case for evaluating the possibility of adding housing to the mix of uses in clean industrial areas. Adding uses to industrial areas could make better use of available infrastructure. Instead of bringing work to people's homes or developing new areas of mixed use, we might retrofit existing employment areas to accommodate housing.

In the late 20th century, Canadian municipalities typically find they cannot afford to build new infrastructure to accommodate growth; neither can they afford to leave adequate infrastructure under-utilized. Modern industrial parks may offer an opportunity to accommodate additional housing in close proximity to employment centres without building new infrastructure. Within the last decade, new types of industrial parks have appeared in the larger urban centres of North America. "Business parks" offer an attractive campus-like environment where large office, research, and distributing companies can locate. Some of those business parks include residential districts. For example, Fair Lakes in Fairfax County, Virginia, has several residential compounds developed to its up-scale standards. Experience demonstrates the viability of providing high quality housing in or around business parks. At this time, however, it appears that few communities have considered in-filling housing in traditional industrial parks.

Sustainable development involves finding ways in which people can meet their needs with minimal disruption of natural processes and functions. We cannot sustain relentless urban

expansion that replaces productive indigenous landscapes with modified landscapes. We must, however, continue to find housing for community members. This case study investigates the potential for opening clean industrial areas to residential uses.

The research project described herein considers the opportunities and constraints of adding residential uses to the mix of uses in an industrial park. In order to consider the viability of housing people in industrial parks, we study Burnside Industrial Park in Dartmouth, Nova Scotia. Burnside is the largest industrial park in Atlantic Canada. With approximately 1200 businesses in 3000 acres, it has experienced considerable success and rapid growth since the early 1970s. In the 1980s, its new section, City of Lakes Business Park, attracted many new office developments. Although the recession of the early 1990s hit hard, Burnside remains a major source of revenue for the city.

During the summer and fall of 1993, the research team analysed the park landscape, interviewed key people, and explored regulatory options in an effort to evaluate the suitability of Burnside for incorporating residential uses. Our analysis shows that industrial parks have the space to accommodate housing, but the significance of the opportunity depends on many factors. Industrial parks have the physical infrastructure to meet most demands, but lack the social framework to support a community of residents. Parks have vast areas of empty pavement and air space over buildings, but industrial activities may prove poor neighbours for residents seeking quiet enjoyment. Are industrial areas suitable for housing people? They remain a poor second choice for most households.

The study demonstrates that with good design planners can congregate housing with industrial uses. However, risks from traffic, noise, odours, and hazardous materials make industrial areas unsafe for many potential residents. The original designers of industrial areas presumed that visitors would arrive by car. Pedestrians find no sidewalks and vast distances between buildings. While households with able-bodied adults working at nearby businesses may find the industrial park attractive, other household types would generally not meet their needs in industrial areas. Furthermore, given the ready availability of low cost and attractive housing alternatives in the Dartmouth area, few people would likely choose to live in the industrial park.

Governments invested millions of dollars in industrial infrastructure during the last few decades with the hope of promoting economic development. In the current recession, they are re-examining their options. While they are anxious to find new strategies for prosperity, they cannot readily abandon old policies. Allowing residential uses in government-financed industrial areas would constitute a new government initiative that may compete with private sector interests. Bureaucrats understandably have mixed opinions about such a change in philosophy. Although they recognize that communities need new approaches for the future, they fear that changing the rules may make the climate poor for investment and business in industrial areas.

Given the results of the case study, we offer the following recommendations to local

governments.

Adopt regulatory mechanisms that allow flexibility to adapt to new circumstances. Overlay zones, special districts, conditional use permits, and performance zoning provide tools for redeveloping portions of the urban environment. Communities that plan for adaptive re-use will avoid finding themselves with outdated assets.

Promote the use of mobile units, reusable buildings, and modular construction (for quick assembly). Adaptive re-use of facilities and co-use of spaces will be necessary in the rapidly changing economic climate of the 21st century. Companies that can adjust quickly to new market requirements and opportunities will prove most viable.

In some conditions, some municipalities will decide to add residential uses to the mix in an industrial park. Other communities will find that choice inappropriate. In each case, communities will consider their objectives, the regional context in which they find themselves, and the viability of the proposed mix. While we conclude that it seems inappropriate at this time to add housing to the mix in Burnside Industrial Park, we believe that planners should continue to investigate the idea for Canadian communities. Further research could develop guidelines and policies to facilitate such mixed use projects.

À CÔTÉ DE L'USINE
Des logements au sein des parcs industriels modernes

RÉSUMÉ

Ces dernières années, plusieurs collectivités ont révisé leurs règlements d'urbanisme pour favoriser l'accroissement de la densité d'habitation dans les zones déjà aménagées. La construction d'habitations intercalaires dans ces zones permet d'optimiser l'utilisation des infrastructures (comme les voies de circulation et le réseau d'égout) et des installations (comme les écoles et les hôpitaux). C'est ainsi qu'une collectivité peut offrir des logements additionnels pour répondre aux besoins d'une population croissante ou pour favoriser la formation de ménages sans avoir à repousser les limites de son territoire urbain. Les concepts de réaménagement des banlieues et de reconquête des centres-villes sont devenus très populaires dans les milieux de l'urbanisme au début des années 90.

Malgré cet intérêt pour l'optimisation des sols urbains, peu de chercheurs se sont penchés sur le potentiel que possède l'aménagement résidentiel au sein même de l'un des grands centres d'emploi de nos collectivités : le parc industriel. Les critères de conception industrielle sont à l'origine d'infrastructures qui demeurent sous-utilisées de 12 à 16 heures par jour. Compte tenu de la nature des parcs industriels modernes, il serait justifiable d'examiner la possibilité d'ajouter les habitations à la diversité des usages qui sont faits des zones industrielles propres. Ce serait certes là faire un emploi efficient des infrastructures en place. Au lieu de demander aux employés d'apporter du travail à la maison ou d'aménager de nouveaux secteurs polyvalents, on pourrait transformer les zones d'emploi existantes pour qu'elles puissent recevoir des habitations.

En cette fin de siècle, nombre de municipalités canadiennes s'aperçoivent qu'elles ne peuvent plus se payer de nouvelles infrastructures pour suivre la croissance ni se permettre de sous-utiliser des infrastructures existantes appropriées. Les parcs industriels modernes pourraient peut-être accueillir des habitations additionnelles à proximité des grands centres d'emploi sans qu'il soit nécessaire d'aménager de nouvelles infrastructures. Au cours de la dernière décennie, des parcs industriels nouveau genre ont poussé dans les grands centres urbains d'Amérique du Nord. Les «parcs d'affaires» offrent un milieu intéressant du genre campus où les grandes sociétés d'affaires, de recherche et de distribution peuvent s'implanter. Certains de ces parcs comportent déjà des secteurs résidentiels. Ainsi, la municipalité de Fair Lakes, dans le comté de Fairfax, en Virginie, possède plusieurs secteurs résidentiels qu'elle a aménagés conformément à des normes très strictes. On a démontré qu'il était viable d'aménager des logements de grande qualité dans les parcs d'affaires ou autour de ceux-ci. Toutefois, à ce jour, peu de collectivités ont songé à intégrer des logements aux parcs industriels traditionnels.

Pour respecter les principes du développement durable, il faut que les gens puissent satisfaire leurs besoins sans entraver les fonctions et les processus naturels. On ne peut soutenir une croissance anarchique des villes qui remplace les paysages naturels par des paysages artificiels. Nous devons pourtant continuer de fournir des logements aux membres de la collectivité. Cette étude de cas porte sur la possibilité d'ouvrir les zones industrielles propres aux bâtiments résidentiels.

L'étude dont le présent rapport fait état livre les avantages et les inconvénients d'ajouter l'usage résidentiel aux divers usages déjà en place dans les parcs industriels. Afin de déterminer s'il était viable de loger des gens dans des parcs industriels, nous avons étudié le parc industriel Burnside de Dartmouth, en Nouvelle-Écosse. Burnside est le plus gros parc industriel de la région de l'Atlantique du Canada. Comptant environ 1 200 établissements commerciaux disséminés sur 3 000 acres, Burnside a connu un vif succès et une croissance rapide depuis le début des années 70. Dans les années 80, sa nouvelle section, le parc d'affaires City of Lakes, a attiré de nombreuses sociétés. Même si la récession du début des années 90 lui a porté un dur coup, Burnside est demeuré une importante source de revenus pour la ville.

Durant les mois d'été et d'automne de 1993, l'équipe chargée de l'étude a analysé l'aménagement du parc, interviewé des personnes clés et exploré les possibilités en matière de réglementation dans le but de déterminer si Burnside se prêtait à l'insertion de bâtiments résidentiels. Notre analyse montre que les parcs industriels possèdent l'espace nécessaire pour recevoir des logements, mais que bien d'autres facteurs entrent en ligne de compte. De plus, les parcs industriels disposent des infrastructures requises pour répondre à la plupart des demandes, mais ils n'ont pas le cadre social nécessaire pour soutenir une collectivité de résidents. Ces parcs se caractérisent par de vastes étendues d'asphalte nu et d'espace aérien au-dessus des bâtiments, mais l'activité industrielle pourrait gêner les résidents en quête de tranquillité. Les zones industrielles peuvent-elles loger des gens convenablement? Disons que la plupart des ménages en doutent fortement.

L'étude montre que les urbanistes peuvent réussir à faire cohabiter des logements et des établissements industriels lorsqu'ils disposent de bons concepts. Cependant, les risques que posent la circulation, le bruit, les odeurs et les matières dangereuses font que beaucoup de résidents potentiels considèrent que les zones industrielles sont trop risquées. À l'origine, les concepteurs de ces zones supposaient que les visiteurs arriveraient en voiture. Les piétons n'y trouvent donc pas de trottoirs, et de grandes distances séparent les divers bâtiments. Les ménages composés d'adultes physiquement aptes et travaillant dans des établissements situés dans ces zones pourraient peut-être voir des avantages à habiter un parc industriel, mais les autres types de ménage n'y trouveraient généralement pas leur compte. En outre, la région de Dartmouth offre déjà des logements abordables et intéressants; donc, peu de gens seraient enclins à se tourner vers les parcs industriels pour établir leur résidence.

Les gouvernements ont investi des millions de dollars dans les infrastructures industrielles au cours des dernières décennies dans l'espoir de promouvoir le développement économique. Mais dans le contexte de l'actuelle récession, ils doivent réévaluer leurs options. Bien sûr, ils ont hâte de trouver de nouvelles stratégies qui pourraient amener la prospérité, mais ils ne peuvent pas abandonner facilement les anciens principes d'action. Le fait de permettre l'usage résidentiel dans les secteurs industriels financés par le gouvernement constituerait une nouvelle initiative gouvernementale qui pourrait aller à l'encontre des intérêts du secteur privé. Les bureaucrates, on le conçoit, ont des sentiments partagés à l'égard d'un tel changement d'orientation. Bien qu'ils admettent que les collectivités requièrent de nouvelles approches pour l'avenir, ils craignent qu'une nouvelle réglementation fasse du tort au climat d'investissement et d'affaire dans les secteurs industriels.

Les résultats de l'étude de cas nous portent à formuler les recommandations suivantes aux administrations municipales :

Il faudrait adopter des mécanismes de réglementation suffisamment souples pour que la municipalité puisse s'adapter aux circonstances. Les zones d'aménagement mixte, les districts spéciaux, les permis de zonage conditionnels et le zonage par seuil de nuisance sont autant d'outils qui permettent de réaménager des portions de l'environnement urbain. Les collectivités qui prévoient l'adaptation à de nouveaux usages éviteront de laisser leurs actifs se périmer.

Il faudrait promouvoir le recours à des bâtiments mobiles, à des immeubles réutilisables et à des constructions modulaires (à assemblage rapide). La réutilisation des installations et le partage des espaces sont deux mesures d'adaptation qui s'avéreront nécessaires dans le climat économique du XXI^e siècle. Les sociétés qui pourront suivre le rythme des changements qu'amèneront les exigences et occasions nouvelles de ce marché seront les plus viables.

Dans certaines circonstances, des municipalités décideront d'ajouter l'usage résidentiel aux parcs industriels. D'autres collectivités estimeront que ce choix est inapproprié. Dans chaque cas, les collectivités prendront leurs objectifs en considération, le contexte régional dans lequel elles se trouvent et la viabilité de la combinaison d'usages proposée. Même si nous sommes d'avis qu'il est peu pertinent, à l'heure actuelle, d'ajouter l'usage résidentiel aux usages du parc industriel Burnside, nous croyons que les urbanistes doivent continuer d'examiner cette idée pour d'autres collectivités du Canada. De plus amples recherches pourraient contribuer à mettre au point des lignes de conduite et des règlements qui faciliteraient ce genre d'initiative.

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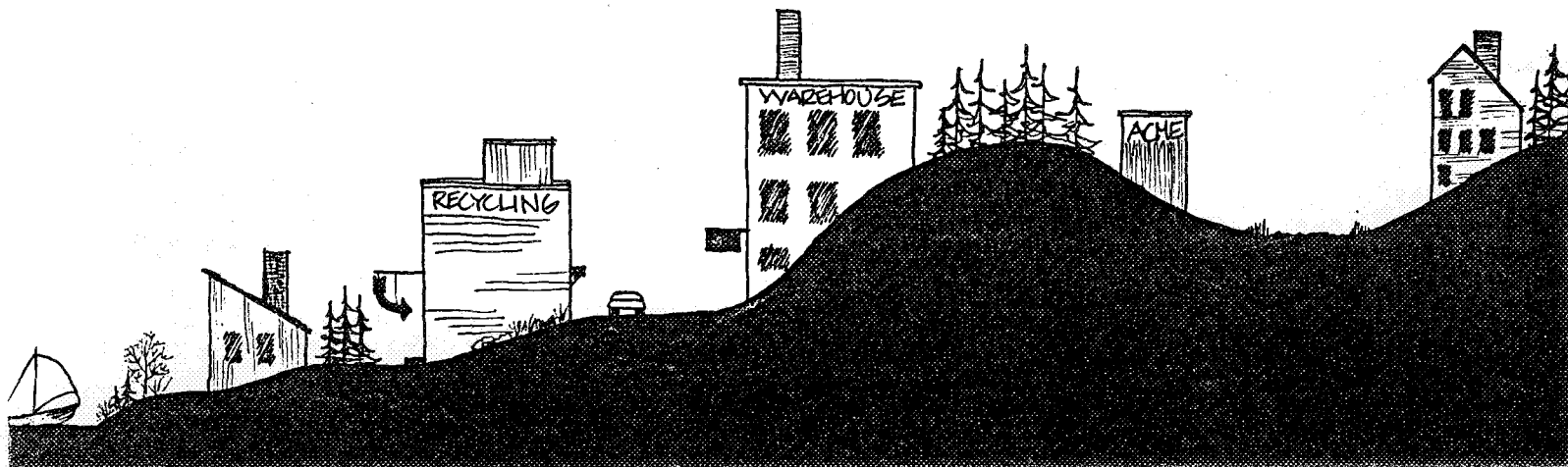
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SECTION 1: BACKGROUND

Housing Options for Industrial Society



LIVING NEAR WORK: SUSTAINABLE OPTIONS FOR THE FUTURE

Developing sustainable strategies for Canadian communities in the 21st century means finding innovative and efficient approaches to housing, transportation, and employment. Unfortunately, housing options for small households with modest incomes remain limited in most urban centres. Many workers commute long distances to work, exhausting non-renewable resources and adding to the traffic and pollution burden. Communities increasingly recognize the need to provide affordable housing close to employment opportunities (e.g., Royal Commission 1991). Intensifying residential uses has become a desirable community planning option.

Residential intensification involves various strategies to increase the density of households in areas well-equipped with services and amenities. Greater residential density serves to limit the urban sprawl which destroys landscapes, habitats, and resources. Many authors view it as part of a strategy of sustainable urban development.

The amount of social and physical capital we have invested in our cities, is of such magnitude that we can no longer afford to discard it as we have done in the past, on the presumption that every time we need a new facility, or launch a new program or form a new household, we build a new building. (Oberlander 1981: 1)

In recent years, several communities have revised planning regulations to encourage greater housing densities in built-up areas (e.g., Toronto 1987). Infilling new households in developed areas makes optimum use of infrastructure (such as roads and sewers) and facilities (such as schools and hospitals): without extending urban boundaries a community can provide additional housing units to accommodate population growth or household formation. "Retrofitting" the suburbs and "reurbanizing" the urban core have become planning buzzwords in the early 1990s.

Communities have attempted to increase residential densities in several ways. Simpson (1993) describes five types of residential intensification: converting buildings, infilling between residential structures, redeveloping whole areas, adapting structures for re-use, and increasing suburban densities. In some areas, changes to zoning bylaws or subdivision regulations reduced minimum lot sizes or allowed owners to add units to existing structures. Accessory units (such as basement apartments) often blend well in the urban fabric (Vischer 1987): new residents can take advantage of services and facilities in the neighbourhood.

Many communities have limited potential for increasing densities in developed areas (Rahenkamp 1992). For instance, in older areas infrastructure may not accommodate additional loading. Unfortunately, residents in areas zoned for "single family" uses often feel threatened by the potential for greater densities (and new categories of occupants) in their

neighbourhoods. Similarly, residents often oppose policies to allow infill housing (where new homes rise between pre-existing units). Talk about increasing density often sets off alarm bells in Canadian communities.

In the 1980s the concept of "mixed use zoning" grew in popularity for redevelopment areas. A philosophy of keeping the streets populated at all hours replaced earlier fears about mixing work and home. Some communities changed regulations to "bring housing back downtown", or transformed abandoned industrial and institutional lands into development areas which include housing projects. In Toronto, for example, a monumental project for "Ataratiri" proposed "converting industrial properties to mixed-use" (Allester 1992: 28). Areas zoned for mixed use typically allow medium to high density residential, along with commercial or office uses. As recessionary times continue into the 1990s, however, it becomes increasingly apparent that large-scale redevelopment projects may have difficulty in securing financing. Also, the housing mix in many redevelopment projects caters to the affluent minority. Working people continue to find affordable housing difficult to obtain in many downtown areas and employment centres.

While residential intensification has many advantages, it also presents some environmental and site planning problems. Increasing density creates environmental consequences: it can make protecting landscape functioning difficult if it involves infilling between existing structures. Accordingly, infilling should become a preferred strategy only where human activity has already significantly disrupted landscape functioning and where infilling protects non-urban land from landscape disruption (Grant *et al.* 1993). Infilling projects must also take care to preserve opportunities for direct solar access for each dwelling or business unit: optimum densities protect right to sun. Good design and site planning become essential to preserve residential amenities in dense neighbourhoods.

Housing in Industrial Areas

Despite the interest in residential intensification, few researchers have considered the potential for developing housing **within** one of the major employment centres in our communities: the industrial park. Given the nature of the modern industrial park, we can make a case for evaluating the possibility of adding housing to the mix of uses in clean industrial areas. Instead of bringing work to people's homes or developing new areas of mixed use, we might retrofit existing employment areas to accommodate housing.

Generations ago town planning gained impetus from the intolerable housing conditions of industrial workers. In 1845, Friedrich Engels described the stench and filth of Manchester, a prime industrial centre.

This sketch should be sufficient to show the absurd planning of the whole district, particularly along the Irk. The south bank of this river is here very steep and between fifteen and thirty feet high. On this declivitous hillside there are planted three rows of

houses, of which the lowest rise directly out of the river, while the front walls of the highest stand on the crest of the hill in Long Millgate. Among them are mills on the river ... Right and left a multitude of covered passages lead from the main street into numerous courts, and he who turns in thither gets into a filth and disgusting grime the equal of which is not to be found ... This is the first court of the Irk above Ducie Bridge - in case anyone should care to look at it. Below it on the river there are several tanneries which fill the whole neighbourhood with the stench of animal putrefaction. (Quoted in Benevolo 1967: 24-25)

Workers typically lived near their employers in early industrial cities. On subsistence wages, few workers could afford transportation to clean, healthful accommodations away from the factories. Accordingly, people often coped with abysmally horrid living conditions. In some communities, employers provided modest housing for workers (see photographs). Indeed, industrial magnates undertook some of the first experiments in planning model communities, in part to provide healthier environments for their workers (Creese 1966). Bourneville in the United Kingdom and Pullman, Illinois, are early examples of planned industrial settlements.

Environmental concerns associated with industrial activities contributed to the public health movement that supported planning reforms at the end of the 19th century. Industrial cities had grown quite unhealthy, with pools of sewage, piles of garbage, and epidemics of infectious diseases. Reformers advocated initiatives to clean up cities and remove sources of infection. In their zeal, they sought to protect people from the hazards of industrialism. The principle of separating living environments from working environments became entrenched within town planning, and indeed within the broader culture. With relatively inexpensive rail and road transport, and increasing industrial wages, workers enjoyed new options for finding attractive housing. For generations regulations exiled industrial uses to the periphery of the community, or isolated them as relict non-conforming uses in pockets in the inner city.

As the 21st century approaches, Canadian industry is changing. Manufacturing jobs disappear while the service sector grows. A large proportion of modern industries are relatively clean (or working to become so). Wholesale, retail, and service industries have joined small-scale manufacturers in many urban industrial parks. Landscaping standards are often high. Despite the amenities, however, after working hours many industrial parks remain largely vacant. Infrastructure designed for peak demand times sits idle as workers head for home in the suburbs. Break-in rates escalate in the evening hours with no one around to notice criminals at work.

Within the last decade, new types of industrial parks have appeared in the larger urban centres of North America. "Business parks" offer an attractive campus-like environment where large office, research, and distributing companies can locate. Some of those business parks include residential districts. For example, Fair Lakes (see photographs) in Fairfax County, Virginia, has several residential compounds developed to its up-scale standards (ULI 1988). The Irvine

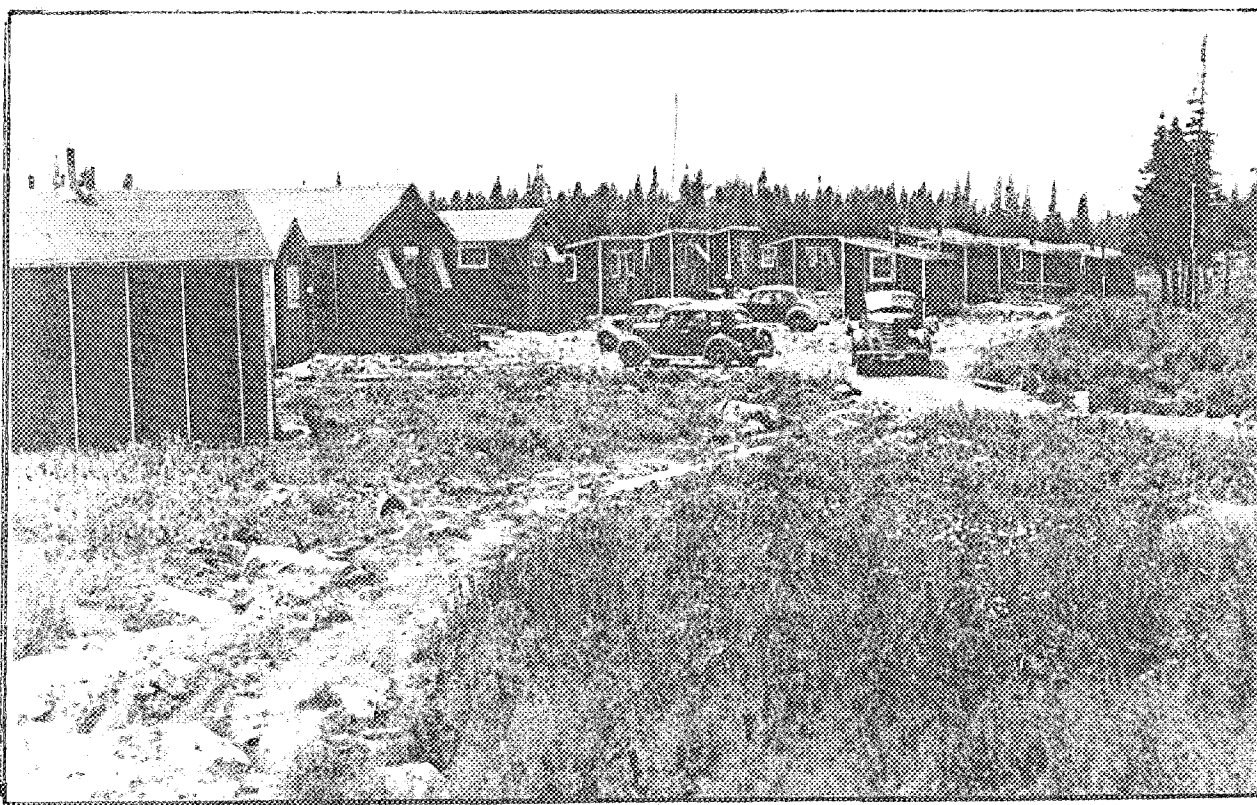
Business Complex in California adopted a mixed use strategy in the 1980s to allow residential uses in the industrial park (Carniglia 1985). Experience demonstrates the viability of providing high quality housing in or around business parks. At this time, however, it appears that few communities have considered in-filling housing in traditional industrial parks.

Finding sustainable strategies for developing our communities demands innovative approaches. Can communities, and their component industrial parks, function more like ecosystems do, with limited energy inputs and waste outputs? Sustainable development requires that we find ways to consume fewer non-renewable resources: for example, people use less fossil fuel if they walk to work; waste heat generated by a manufacturing process can warm nearby homes quite efficiently. Planners may offer residents new options for sustainable lifestyles by providing housing closer to industry.

In the late 20th century, Canadian municipalities typically find they cannot afford to build new infrastructure to accommodate growth; neither can they afford to leave adequate infrastructure under-utilized. Modern industrial parks may offer an opportunity to accommodate additional housing in close proximity to employment centres without building new infrastructure.

PHOTOGRAPHS

Employers in Nova Scotia mining, agricultural, and industrial communities often provided workers with housing near work. The photographs show modest housing for workers at Dufferin Mines in 1937 and at 15 Mile Stream (no date). (Source: Nova Scotia Department of Natural Resources)



PHOTOGRAPHS

In Fair Lakes Business Park, Fairfax County, Virginia, developers Hazel / Peterson included large residential pockets as part of the land use mix. Fair Lakes has no light or heavy industry; hence, it resembles City of Lakes Business Park in Burnside.

Housing in Fair Lakes does not abut commercial and office uses directly. Most of the units are walk-up apartments and condominium units.



OPTIONS FOR REGULATING LAND

In this section, we briefly review the types of regulatory environments which communities employ to control industrial land. The analysis indicates that communities have a large repertoire of land use mechanisms to consider in regulating industrial land. Some approaches make it easy to integrate housing into the mix, while others may make it more difficult. Provincial or state legislation limits the real choices available to communities. Governments seeking to open up new opportunities for sustainable development may want to view the full range of alternatives before settling on a strategy for industrial development in the 21st century.

The Origins of Zoning

In Canadian and American culture, people express their identities in part through their housing (Hummon 1989). Our dwellings often convey messages of social rank, class identity, and individual self-image; as Hummon (1989:208) says, through housing we reveal our "symbolic placement" in the world. Zoning has given us valuable tools to control the character and identity of our neighbourhoods.

Why separate "incompatible" uses? Since the "Progressive Era" of the turn of the twentieth century, industrialized societies have generally sought to separate different kinds of land uses. Urbanists worried that housing people near industries contributed to health problems. As planning and zoning grew in popularity, the principle of keeping housing far from industry dominated land regulation.

During the early years of zoning, communities often employed cumulative zoning: they allowed "higher" uses in lower zones, but not vice versa. For example, housing could locate in industrial zones, but industry could not build in residential areas. In the post-war period, exclusive zoning became more common. Each zone allowed a limited range of uses: industry and housing required significant separation by other uses or buffer zones (ULI 1988).

Until relatively recently, planners argued that various land use activities perform best when segregated (e.g., Hodge 1989). Zoning kept things in their place, while protecting property values (Babcock 1966). People appreciate the predictability and stability zoning gives to neighbourhoods and land values.

Almost all large communities in North America have adopted zoning since the 1920s. Even Houston TX, one of the last hold-outs against zoning, finally proposed a zoning ordinance in the early 1990s (Porter 1993): residents pressured politicians to set zones that would protect residential neighbourhoods from speculation and incompatible uses (Dillon 1991).

How do communities set zoning standards? Communities seldom develop standards sufficiently suited to their needs. Instead, they shop around for zoning codes and regulations, then cut and paste them together (Campbell Oct. 1992; Griggs *et al.* 1984). Most communities have adopted prescriptive standards which prove easy to administer and sufficient to control quality; some communities employ performance standards which give greater flexibility in design, but demand greater staff expertise and time to implement (Archer 1981).

Are regulations a problem? A lot of developers and architects certainly see regulations as problematic. Developers suggest that regulations drive up the cost of development and slow down the process. Architects feel that regulations stifle innovation and increase costs (Architectural Record July 1992). Strict regulations make it difficult (and expensive) to mix uses, since standards typically differ by activity.

Engineers often justify high standards for roads because of traffic volumes and technological requirements. Traffic safety demands clear sight distances, wide lanes (for parking), and turning radii. Snow clearing and fire equipment preclude narrow lanes and one way routes. In response, critics may argue that traffic volumes will simply increase to fill road spaces. A few voices ask whether we need to purchase large vehicles for fire control: why not return to smaller fire trucks (Architectural Record July 1992)? Why not gear street widths to their functions (Progressive Architecture 1991) instead of endless expansion?

Department of Transportation standards in Nova Scotia require a 20 metre right of way for subdivision roads, and a minimum cul-de-sac length of 150 metres; they no longer allow boulevards in subdivisions (Planning Developments 1989).

Traffic engineers have come under attack in many jurisdictions for being too concerned with free flowing traffic (Fulton 1991). They could improve safety and livability by slowing down traffic. Popular design approaches, like neo-traditional town planning, often advocate narrow streets and on street parking to slow traffic.

What model of community are we using? Critics of typical approaches to land regulation argue that our approaches depend on a model of community that no longer reflects reality. For many years, planners relied implicitly on the "neighborhood unit" model proposed by Clarence Perry in the 1920s (Perry 1929). Many authors suggest that the model has grown outdated (e.g., Richman 1979). Households have changed, with smaller numbers of members typical in recent years: for instance, in Dartmouth the mean number of occupants per household has decreased from over 4 in the 1950s and 1960s to 2.6 in 1991.

Mean Numbers of Occupants in Household, Dartmouth

Year	1951	1961	1971	1981	1991
Mean/ HH	4.1	4.2	3.8	2.9	2.6

As household size declines, and household types change, we should consider alternative housing and site planning criteria (Archer 1982). Adult-only households, such as "empty nesters" or "DINKs"¹, may not require large lots or other traditional standards.

Because household sizes have declined while dwelling sizes and spacing have not, urban densities have decreased in many communities. Infrastructure designed for reasonably high densities remains under-utilized (Toronto 1987). At the same time, communities find they lack the resources to build additional infrastructure for new development outside the serviced area. Many communities prefer a strategy of residential intensification and infill housing to increase urban densities and make use of existing infrastructure.

Simpson (1993: 6) describes five types of residential intensification: "conversion of existing units or buildings; infill; redevelopment; adaptive re-use; and suburban densification." Some of the strategies involve filling up the spaces between existing units, while others suggest converting non-residential buildings to dwellings. Archer (1982) suggests that communities use performance standards to set principles for integrating infill housing or converted uses into existing neighbourhoods.

Unfortunately, some community residents do not welcome infill housing (Simpson 1993). They fear greater density; they resent changes to their neighbourhoods. The success of infill housing strategies depends on several factors, such as complementary character, sensitive design, types of units, type of tenure, composition of new residents. Other types of intensification strategies face similar opposition in many areas.

In sum, then, most communities continue to use traditional zoning approaches to promote growth and to regulate the use of land. Communities that hope to move away from segregationist approaches towards sustainable development strategies need to consider the alternatives available.

¹ Double Income No Kids

Alternative Approaches to Regulating Land

Many voices suggest that we need a new regulatory environment reflecting our goals for the next century. Hulchanski (1993) argues that we cannot meet the housing needs of our communities without moving towards inclusive community planning: small scale, bottom up, proactive, micro-level. While traditional zoning approaches have given communities some control over development, they have not necessarily delivered livable environments (Haar and Kayden 1987).

Goldberg (1982) characterizes land use controls by the following matrix, with examples to illustrate.

Types of Land Use Controls (Goldberg 1982)

	POSITIVE	NEGATIVE
DIRECT	public investment	traditional zoning
INDIRECT	infrastructure	sewer moratorium

Municipal governments may use direct or indirect methods of controlling land: putting money into infrastructure, for instance, indirectly encourages development to locate in serviced areas. Measures like zoning, which constrain options, are negative, while Goldberg considers public investment strategies positive.

Regulatory approaches may differ depending upon the ends and the means communities elect to pursue. In the next sections we first review community ends and goals, then discuss possible means available to communities.

Alternative Goals for the 1990s

Communities may adopt a variety of alternative goals which influence the regulatory environment. In contrast to traditional goals of economic growth, new objectives focus on quality of life issues.

* Promoting compact development

Traditional spacing requirements have encouraged urban sprawl. Large lot sizes, frontages, yard setbacks, road dimensions, and parking requirements increase the cost of development, and diminish the potential for mass transit (Cervero 1986, 1991; Lowe 1992). Compact development increases the viability of mass transit, and makes better use of infrastructure.

Vertical buildings provide denser housing, but the costs of providing footings and elevators are high. Low rise housing also provides reasonably high densities.

Designers like Robert Yaro and Randall Arendt promote cluster planning for single detached housing in exurban areas (Yaro *et al.* 1993). Cluster development allows builders to protect environmentally sensitive areas while providing sufficient density to offer some common services (like sewers). Yaro advocates clusters of 30 or more dwelling units, often around a central commons or green, much like traditional New England communities.

Communities in many industrialized nations are retrofitting residential areas to increase densities and decrease car use. Richardson (1989) reports that New Zealand employs narrow streets, lanes, and right of ways to link nodes and encourage walking. High density residential environments usually mean less car use, but gasoline prices also play a significant part (Cervero 1991). Land use planning plays an important role in reducing traffic congestion, but gasoline taxes and sprawl charges could have an even greater impact.

Delsohn (1989) describes Peter Calthorpe's work to integrate pedestrian pockets into a development at Laguna Creek. Designers tried to have all of the development within 1/4 mile of a transit stop. The final plan remained at a fairly low density, however, with only 6 dwelling units per acre.

Part of the attraction of the neo-traditional town planning approach which has attained considerable popularity in the early 1990s is the designers' commitment to a pedestrian-oriented environment (Duany and Plater-Zyberk 1992). However, as Tennenbaum (1990: 17) notes, "Only in dense cities with an efficient mass transit system will people rely less on automobiles."

Building to higher floor area ratios (FAR)² will increase the density of industrial areas (Cervero 1991): a FAR of 2 or above will create a density of workers which can sustain transit use. Employers can discourage car use by charging for parking, giving priority parking for car pools, or forming vanpools.

Metropolitan Toronto has adopted a new plan (Toronto 1992) to promote "reurbanization", or the development of compact nodes within built up areas (Lewinburg 1993). The plan would encourage greater use of infrastructure, under-used land, and mass transit. Queens, NY, has adopted a similar plan to revise zoning to promote higher density in areas serviced by mass transit (Hornick 1990).

² The floor area ratio relates the square footage of the building to the square footage of the lot.

* **Environmental protection**

Ecosystem approaches have gained in popularity during the last decade as communities recognize the need to protect the environment. Metro Toronto's The Livable Metropolis (1992) draws on an ecosystem approach in advocating development nodes and a reurbanized metropolitan structure.

Urban forest programs may seek to protect forest resources (Richardson 1989). Many communities have adopted tree planting programs (e.g., Dartmouth), or tree-cutting bylaws. "Greening" cities has grown considerably in popularity in the 1990s. Planners have grown increasingly concerned to ensure that land regulations allow them to protect the environment.

* **Equity**

Traditional zoning has not provided adequate housing for low income families in our communities. Neither has it met the needs of many disabled Canadians. In order to provide housing for all, we need a variety of housing types. Most communities have no difficulty in zoning land for single detached housing; however, rezonings for high density residential uses often result in nasty neighbourhood fights.

Campbell (July 1992) suggests that in the 1990s the notion of a generic household has lost meaning. The "traditional" family of husband, stay-at-home wife, and two children constitutes less than 10% of all households. Every household has special needs. We need to plan safe, integrated, participatory communities. Some US states have adopted "anti-snob zoning laws" to prevent exclusionary zoning. Unfortunately, large lot requirements continue to discriminate in many communities (Knack 1991a).

Since the 1970s efforts to create "social mix" have advocated integrating the poor with other households. Campbell (July 1992) insists that we must avoid depositing a critical mass of the poor in neighbourhoods. Many communities have followed Oscar Newman's (1977) advice and refused to build high rise (HR) dwellings for the poor. Some communities have actually demolished HR social housing suffering from deterioration. Most only consider high rise for condominium sales or luxury rentals.

Zoning provisions have generally neglected to deal with the needs of disabled residents. While governments gradually renovate public buildings to meet access requirements, adequate housing for those with special needs remains a problem in many communities.

* **Linking jobs and housing**

In high growth areas in the US, communities have established strategies to link development opportunities with providing worker housing. Many planners suggest that sustainable communities must achieve a balance between jobs and housing (Hall 1993). Costa Mesa CA, for example, requires developers to provide on-site or local housing for at least 20% of the workers their projects will generate (Cervero 1986).

Mixed use zoning that puts homes and businesses in proximity allows greater integration of uses. It requires careful attention to the pattern rather than the pace of growth (Lowe 1992). New zoning laws will be necessary. Lowe (1992) suggests that planners mingle clustered SFD and 2-6 storey apartment buildings to create outlying compact centres of activity around a dense downtown area. Metropolitan Toronto (1992) has taken a similar approach to its reurbanization: it seeks to have 1 job for every 1.5 residents. (As of the 1981 census, Dartmouth had 1 job for ever 1.89 persons. See Table 1) The Toronto plan seeks to create communities within a walking radius of 1 km, so that people will consider walking to work (Lewinburg 1993).

Table 1: Jobs to People Ratio for Dartmouth, NS

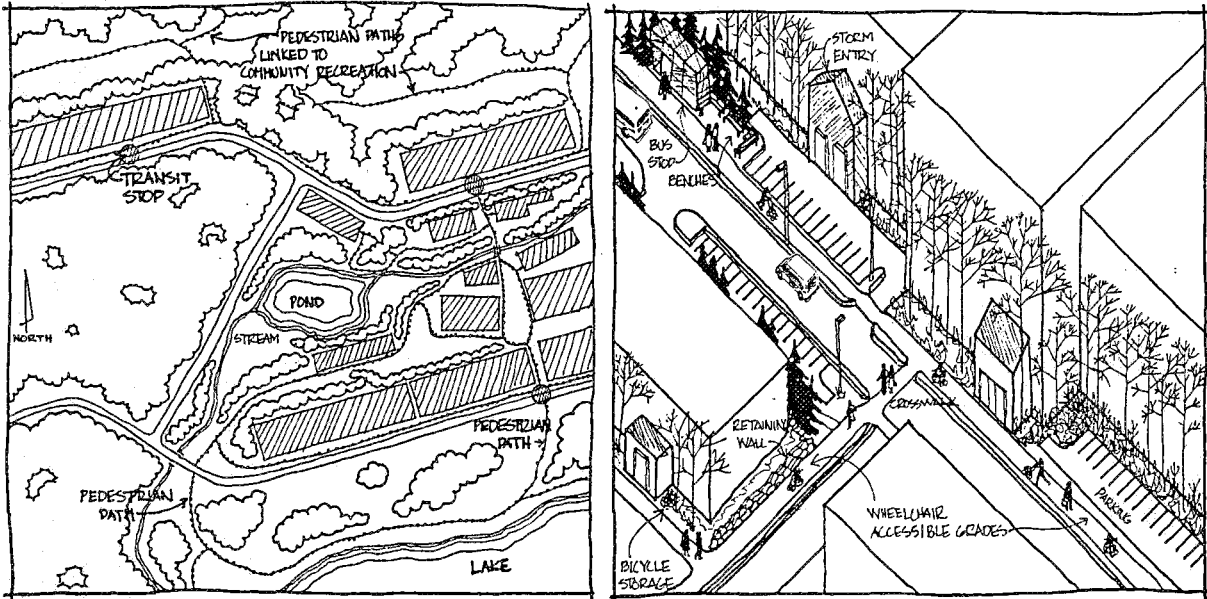
	1951	1961	1971	1981	1991
Population	15,037	46,966	64,770	62,277	67,798
Labour force	5,255	16,137	26,300	32,875	n.a.
Ratio: jobs to people	1 : 2.86	1 : 2.91	1 : 2.46	1 : 1.89	

Cervero (1991) suggests that many American communities are too unbalanced in their jobs-housing ratio. Some have two to four jobs per dwelling, while bedroom communities have ratios of .25 to .20 jobs per dwelling (or 1 job to 5 residents). People need opportunities to live near work: not necessarily over the store, but within a reasonable distance.

In parts of Southern California, communities have encouraged vertical mixed use developments (Van Tilburg 1992). Developers may receive incentives for building housing over stores and office developments. For example, some communities offer to double the allowable floor area ratios where developers build at least 20% of residential units as affordable. Van Tilburg reports that higher night-time volumes for businesses balances the reduced income and tax base. Regulations and performance standards controlling odours (eg, from restaurants) and building design have avoided problems.

* **Pedestrian friendly site design**

With effective site design, pedestrians may feel more comfortable walking around our industrial parks. Cervero (1991) suggests that planners require sidewalks, parking at rear, landscaping, lesser building setbacks, cycling networks, shower facilities at work, reduced volumes of parking, and bus lanes. In cold northern climates, storm porches and vegetation to reduce wind speed also improve conditions for pedestrians.



Designing for Pedestrians

Summary

Not all communities have adopted the goals discussed in this section. However, many communities concerned about social welfare or environmental issues do discuss these ends. Communities' abilities to achieve ends such as equity, environmental protection, compact development, linking jobs and housing, and pedestrian friendly design depend on efforts to adjust the means by which we regulate land use.

A Variety of Methods

Zoning is a simple system. It allows certain uses, prohibits others. By contrast, some of the methods described here seem complicated. While some remain conceptual and untried, most have their advocates in communities willing to experiment with new approaches.

* Performance standards

Performance zoning has experienced growing popularity in North America during the past decade. Although it requires greater staff expertise and time to implement, performance zoning simultaneously offers greater flexibility in site planning and design (Porter *et al.* 1988).

Performance standards set criteria that a development must meet: they do not tell a developer which means to use, but only set the ends to achieve. For example, the standard may indicate the allowed volume of run-off for the site. Builders could use a variety of techniques to prevent run-off, provided they meet the standard.

Kendig *et al.* (1980) suggest four key ratios to consider in performance zoning for environmental protection.

open space ratio	=	$\frac{\text{acres of open space}}{\text{gross site area}}$
impervious surface ratio	=	$\frac{\text{acres of impervious surface}}{\text{gross site area}}$
density	=	$\frac{\text{number of dwelling units}}{\text{gross site area}}$
floor area ratio	=	$\frac{\text{square feet of built space}}{\text{gross lot area}}$

Kendig recommends clustering residential uses and minimizing impervious surfaces to protect habitat areas. He suggests that communities could set acceptable ratios, then let builders find designs or plans to meet the criteria.

Standards used in planned unit development ordinances may also include measures of land use intensity, livable space, recreation space, or parking. Porter *et al.* (1988) describe impact models in which communities may evaluate the environmental and social impacts of proposed developments.

Planners have also used performance standards for industrial zones (ULI 1988). For example, communities may permit industries that can meet certain standards for noise, smoke, odours, dust, noxious gases, glare, heat, fire hazards, solid and liquid wastes, transportation and traffic, aesthetics, psychological conditions, vibration, and radiation. Such standards caught on quickly in the post-war period, and allowed communities to evaluate each building individually.

Communities typically resist performance zoning because they fear they will need a large staff to administer the approach. McElroy (1985) argues that small communities with limited staff have successfully implemented performance standards in Michigan. In this case, staff apply performance standards only where they expect major growth (or problems) to occur. McElroy argues that adapting standards to local areas and selecting key elements to monitor can increase success. Easley (1985) similarly reports that using a selected number of performance standards has proven successful in Sun Belt communities in the US, and has reduced the number of public hearings required for developments.

* **Revised regulations**

Some communities have adjusted their development regulations in recent years to accommodate change. For example, some areas have reduced minimum lot frontages and sizes to allow greater densities and to reduce the cost of serviced land (Griggs et al 1984). Test studies on zero lot line housing show that it can work successfully with appropriate attention to site planning and housing design (Hiscox 1981; Kelly 1983).

Since the late 1960s, many communities developed new "industrial park" zones or areas with specific space and aesthetic standards (ULI 1988). The new parks required a development plan for the site along with a small number of performance standards. Low structural densities and excessive open space requirements often resulted. For instance, the parks typically require large setbacks, minimum lot sizes, height limits, sign controls, and parking standards. Such parks consume a great deal of land at low densities.

Recently, many jurisdictions have adopted business park zoning (ULI 1988). The business park expands the range of uses traditionally associated with industrial areas. Office, warehousing, retailing, and sometimes residential uses move into industrial areas, while the heavy industry moves out. Regulatory approaches vary in business parks: parks may use performance standards, site planning agreements, or design guidelines. Most still include a list of permitted or prohibited uses.

ULI (1988) describes four types of zoning districts typically used.

1. "By right" districts. (gives a list of permitted uses; offers little flexibility)

2. Planned unit development districts. (a flexible floating zone applied when approved by authorities; usually requires a comprehensive development plan; can accommodate a mix of uses to create synergy)
3. Special zoning districts. (flexible regulatory form applied to an area; requires a site specific plan, custom design; easy to tune to market demand) (see also, Babcock and Larsen 1990)
4. Zoning provisions. (fixed regulations or performance standards; incompatible uses prohibited; provides predictability)

Morris (1993) advocates creating a unified development code to bring zoning and subdivision regulations together. She suggests that a unified code enhances flexibility for developers and speeds up processing of applications.

* **Inclusionary zoning**

Several US states have adopted inclusionary zoning policies during the last decade in response to court rulings (Drdla 1993). Inclusionary zoning requires communities to zone land for affordable housing, then provides the market with opportunities to build. The practice presumes that providing specific housing types will target particular households in a community. Inclusionary zoning turns traditional zoning on its head by requiring that certain uses be included in the development of a community, as a condition of development.

Ontario experimented with inclusionary zoning in its 1989 *Land Use Policy*. It required municipalities to zone land for multi-family housing. Although the policy forces communities to face the inherent inequities in land use planning, it does not necessarily remedy injustice. For example, zoning land for townhouses does not guarantee that dwellings built will prove affordable to community members.

* **Overlay zoning**

Certain parts of a community may offer the potential for redevelopment or special development. Overlay zoning allows planners to place additional or different regulations and criteria over particular areas.

For example, communities may identify an area or node as meeting the criteria for increasing density. Perhaps the node is on a mass transit route, or has a large number of job opportunities. An overlay zone could establish the requirements for infilling in that area: it may, for instance, allow additional uses, or demand particular site planning standards.

Howland (1992) reports that Cleveland is experimenting with overlay zoning to protect industrial areas as they make a transition to new uses. Redevelopment overlay zones are imposed over existing zoning. Developers may build either the old allowed use or the new allowed use, but not both. The overlay shows desired future use superimposed on existing land use. In this case, the overlay facilitates conversion from one type of use to another, rather than mixed use developments. The overlay does not require a public hearing for adoption of the new use, and so facilitates processing of applications. Cleveland's approach offers a form of "time zoning" where the planned use changes over time (Goldberg 1982).

Some authors talk about **floating zones** which would allow a range of developments if developers follow certain broad guidelines (Goldberg 1982).

* **Conditional use permits**

As growth pressured Irvine CA, planners began looking at zoning in the Irvine Business Complex, a 2500 acre industrial park (Carniglia 1985). In 1981, Irvine adopted a new plan allowing mixed uses in 95% of the complex. With a conditional use permit, developers could build housing in the complex. Planners regulate the intensity of land uses according to traffic demands: because housing typically generates traffic at different times than office uses, it is not considered to create traffic impacts. Irvine placed a total limit of 15 million square feet of development for IBC, expecting that to build up over 15 years: however, within two years of the plan, developers had submitted speculative proposals for the full intensity.

Some authors argue that communities should allow certain uses anywhere, provided necessary conditions can be met. Hulchanski (1993), for example, advocates allowing all kinds of housing on residential land: caps on particular kinds of units ends up discriminating against low income households. Conditional use permits could facilitate the regulation of infill housing.

Communities could award conditional use permits if developments meet particular criteria. For example, Porter *et al.* (1988) describe "project rating systems" in which developers receive points for providing particular amenities or meeting certain standards: if they achieve enough points, they receive the permit.

In certain circumstances, communities may reach public/private agreements to develop a site (ULI 1988). Negotiated agreements, especially at the site planning stage, can ensure that all parties achieve their objectives. Dorius (1993) argues that the use of alternative dispute resolution techniques can allow all of the interested parties to work together in joint problem solving over development options.

* **Mixed use zoning**

Many planners see mixed use zoning as an important advance in the field. Mixed use zoning allows communities to plan to combine uses in a given area. It calls for fusion instead of exclusion (Cervero 1991: 123); congregation instead of segregation.

Mixed use zoning first appeared in the 1970s as a strategy for reversing blight and decay in the inner city (Witherspoon *et al.* 1976). Combining three or more significant revenue generating functions in an intensive use of downtown lands would increase the vitality of the city. Marina City in Chicago offered an example: on 3.2 acres along the Chicago River developers built a site housing 1500 residents and 700 jobs in retail, service, and office sectors. Witherspoon *et al.* (1976) emphasize that a strong residential component promotes the success of a mixed use project.

In its proposed zoning system, Houston TX makes liberal use of "open districts" which allow almost all uses except heavy industrial. Twenty uses require conditional permits.

* **Design guidelines**

Many communities have adopted design guidelines in order to try to control the character of development in certain areas. For example, heritage districts may require that developers retain historic characteristics. In industrial areas, builders may have to meet landscaping or building standards beyond those normally required. Design guidelines typically increase the quality and the costs of development.

Haar and Kayden (1987) suggest that communities need to find a balance between preservation and growth. In setting design standards they should consider what is necessary to protect the quality of life, and what is mere ornamentation.

Zotti (1991) argues for specific, detailed, enforceable, simple, and well organized design guidelines. Guidelines often direct the site plan review process (Zoning News 1986).

Phoenix AZ adopted a city wide design review ordinance in 1990 for assessing commercial and multi-family projects (Gammage 1991). Residents found the old development permit process gave insufficient control over the style, context, comfort, visual interest, and convenience of a design. Guidelines also deal with siting criteria related to topography, streetscape, parking, landscaping, building scale and design, solar access, and special features such as heritage. The guidelines come in three categories: requirements (must do), presumptions (usually apply, but can argue to omit), and considerations (things to think about).

* **Covenants, conditions, restrictions**

Developers often impose covenants on purchasers to try to enforce conditions on a community (ULI 1988). Restrictive covenants can upgrade standards in a community, but without enforcement they provide little security. Conditions attached to specific sites allow developers to enforce a particular design concept. Typically, restrictions deal with issues like uses, nuisance, design guidelines, design review procedures, and legal provisions.

* **Development incentives**

Governments can arrange taxing policies in order to ensure that companies make profits (not just tax write-offs). ULI (1988) suggests a number of types of incentives. Federal income and corporate taxes can provide a good climate for business. At the state and local levels, business incubators can provide subsidies to get businesses started; unfortunately, businesses may leave when the subsidies end. Customized training, or connections to post secondary institutions, can attract businesses.

Enterprise zones have attracted industry to underdeveloped areas. Incentives vary: tax exemptions (sales, income, use) or reductions (on land); venture capital at low interest; employee training; regulatory adjustment; tax increment financing³; infrastructure improvements. Enterprise zones offer a good marketing tool but their success depends on appropriate potential in population and markets (ULI 1988).

State grant and loan programs may facilitate corporate borrowing. Commercial loans, guarantees, infrastructure, or seed money can assist businesses to find financing. All 50 US states provide some financial assistance for new businesses and industry (ULI 1988).

Incentive programs can prove highly expensive, and may not guarantee community returns (Guskind 1990).

* **Zoning by numbers**

Babcock and Smith (1985) advocate a system of zoning in which communities set quantitative standards for spacing requirements (e.g., the distance between gas stations or adult entertainment bars; distance from residential uses) or for the number of uses allowed in a given area (e.g., the number of restaurants in a zone). A Berkeley ordinance limits the numbers of banks, stores, craft shops, and restaurants; Evanston limits the number of group homes (and requires a 2500 ft separation between them). Vancouver apparently considered adopting an

³ Tax increment financing refers to communities financing improvements by borrowing against future tax revenues from a developed site.

open space index that would account for the amount of open space on neighbouring sites, but did not adopt it (Babcock and Smith 1985).

* **Building block zoning**

Sedway and Loyd (1977) describe a form of zoning which superimposes three components in regulating a piece of land.

1. use unit (the most fundamental unit governs allowable uses: residential, industrial, commercial, civic, extractive, agricultural)
2. development unit (governs how to develop use: density, size, setbacks, open space, landscaping)
3. special area unit (overlay or additive unit governs special areas like floodplains, beaches)

Building block zoning seems quite complex to operate.

* **Impact fees or linkage programs⁴**

Rapidly growing regions can often demand fees from developers to meet various needs in the community. For example, Irvine CA extracts circulation fees for traffic improvements (Carniglia 1985): developers may receive fee credits for building housing or retail facilities. Other communities use the fees for building social housing, or for community improvements.

According to ULI (1988), 58% of communities surveyed by the National Home Builders Association (USA) exact development fees. Fees may be based on traffic generated, square feet built, number of residential units built, or a percentage of development costs. Some communities require or accept land donations instead of fees.

Linkage fees are rare in Canada: Richmond BC has used them, and Toronto considered, but rejected them (Drdla 1993). Most provinces do, however, let communities collect fees or land from developers to provide parks in residential areas (Planning Developments Oct. 1989).

* **Bonus or incentive systems**

By offering developers special incentives, planners may achieve site planning or facility improvements. For example, developers may provide bicycle paths and shower facilities for workers in return for a density bonus (Cervero 1991).

In areas like California where bonus systems have met with success, communities typically offer

⁴ This method and those that follow are suitable only for growth areas.

density bonuses for developers who provide moderate or low income housing (Porter *et al.* 1988). For instance, builders may receive extra units for providing affordable units, infrastructure improvements, school sites, fire equipment, or recreational facilities. In other cases, developers may receive density bonuses for building near community infrastructure such as schools, parks, jobs, or the downtown. When communities provide opportunities for density bonuses, they must ensure that good design guidelines will control the quality of resulting development.

Toronto and Vancouver experimented with bonus systems, but dropped them for lack of developer interest (Drdla 1993). During the 1980s Toronto offered some developers greater height and density in return for considerations such as day care facilities (Vaughan 1988, Feb.).

The Nova Scotia Planning Act does not allow bonus zoning: however, some Municipal Affairs staff think it desirable to control the range of uses, scale and rate of development, and so may advocate bonus systems (Planning Developments Oct. 1989). Communities can alter density and height through the current development agreement process, but the Act does not enable communities to extract concessions in the process.⁵

* **Transfer of development rights**

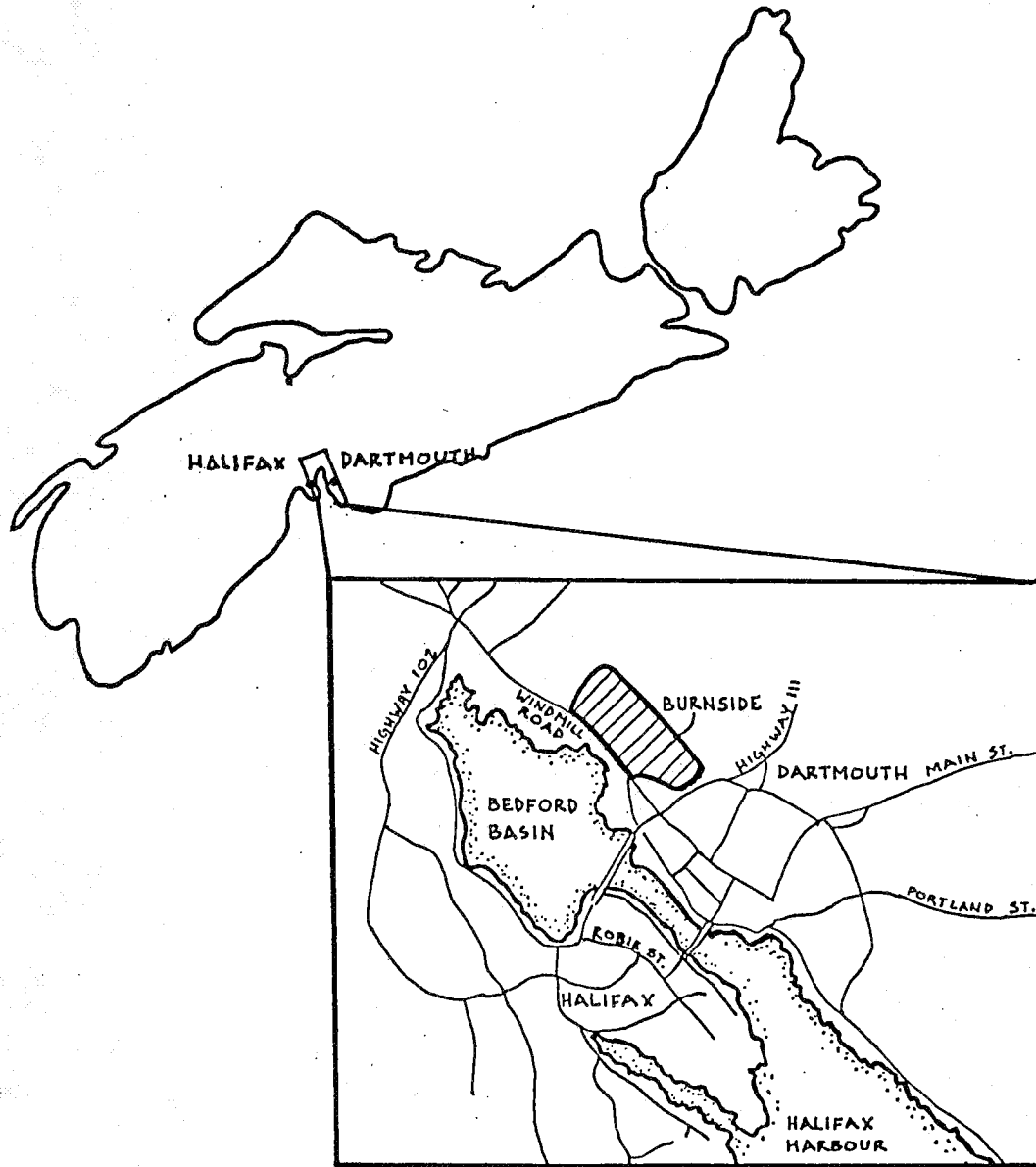
Where redevelopment may threaten existing neighbourhoods, communities may consider transferring development rights (Drdla 1993). For example, parts of the urban core zoned for high density uses may still contain viable residential districts. Some jurisdictions allow land owners to sell their allowable density to sites in other parts of the community: thus the density transfers another property.

Summary

Communities may choose from a variety of mechanisms to find a strategy for regulating land use to meet their ends. Traditionally, Canadian provinces have enabled and municipalities have adopted relatively simple mechanisms. Finding sustainable strategies for the future will undoubtedly require innovation and experimentation.

⁵ However, planners often convince developers to provide some community amenities, like better landscaping or environmental protection.

MAP 1
LOCATION OF BURNSIDE INDUSTRIAL PARK
Dartmouth, Nova Scotia



REGULATING LAND USE IN NOVA SCOTIA

Existing Provincial Framework

Under the Nova Scotia *Planning Act* (1983, with later amendments), municipalities may develop policies in their Municipal Planning Strategies (MPS) to govern use and intensity (38-e), to require environmental studies (38-f), to encourage conservation of energy (38-n), and to allow comprehensive development districts (38-p-ii). Such policies would prove helpful in facilitating sustainable development in industrial areas such as Burnside Industrial Park in Dartmouth.

Section 52 of the Planning Act indicates that the municipalities' Land Use Bylaws (LUB) "shall provide for the establishment of zones". Zones may indicate prohibited or permitted uses. LUBs can regulate location, height, area of structures, size of yards, open spaces, architectural design. LUBs may indicate minimum requirements for frontage and lot area; they can set maximum requirements for floor area, lot coverage, and population densities.

The Planning Act allows municipalities to adopt policies for comprehensive development districts (Section 56) and for performance standards (Section 57). Such tools would assist a municipality considering mixed use zones as part of a sustainable development strategy.

Existing Municipal Framework - Dartmouth

In general, the plan (1978 Municipal Development Plan and Land Use By-law) reveals a desire to separate industrial and residential uses. The plan indicates that heavy industry proves obnoxious to residential uses. Industrial areas typically generate heavy traffic which should not enter residential areas. Planners suggest that council locate industry for least disturbance to residential areas.

Several bylaws amend the MDP. Bylaw C-476 revised industrial policies. It added a Waterfront designation where all uses seem possible, subject to permit. Bylaw C-475 extended the development boundary to include the lands east of Burnside Drive. Drawings show the City added 3000 feet to the industrial park in April 1983.

Bylaw C-507 provides for medical centres by development agreement in residential areas. Considerations include: use and size of structure, number of storeys, compatibility of design, buffering, yard requirements, coverage, hours of operation. Bylaws C-520 and 522 deal with medium density housing downtown. C-520 sets a maximum density of 90 units an acre. C-522 specifies a maximum of 80 units for the senior unit on Ochterloney.

The LUB, or zoning bylaw, identifies requirements for each zone. The plan had several categories of residential uses: R1, R2, R3, R4, TH, T (Mobile). It also included four multi-family zones for apartments: MF1, MF2, MF3, MF4. However, Council subsequently amended the by-law, first repealing the MF zones (Bylaw C-392), then allowing apartment development in any zone only through development agreement (By-law C-691, 1991).

Regulating by development agreement has grown increasingly popular in Dartmouth through the years. Corner stores, day care centres, apartment buildings (with three or more units), and residential development on old undersized lots all require development agreements. Such provisions may delay development and increase the costs for builders.

Parking requirements differ by zone. In residential zones, most dwelling units (d.u.) require one parking space. However, apartment buildings require 1.25 spaces per d.u.. Parking requirements differ according to built space volumes for commercial, industrial, and office developments. (see pp. 3-12)

Some provisions of the LUB allow builders greater numbers of dwelling units in return for internal parking or for building beside public open space of 5 or more acres (R4 zone, pg 12). The MF zones allow builders to build use smaller sites in return for internal parking or location near open space (pp 25-30).

The LUB regulates the maximum height of buildings in the MF zones: MF2 - max. 12 storeys exclusive of storeys which do not include apartments; MF3 - min. 6 storeys, max. 12 storeys; MF4 - min. 8 storeys. Side yard requirements vary with height.

The GC zone (page 32) allows the uses from the MF3 zone, plus businesses and commercial uses (but not those which are obnoxious or hazardous).

Bylaw C-514 defines obnoxious uses to include: noise, vibration, glare, electrical interference, fire, explosion, gas, fumes, dust, oil, foul odours, unsightly storage or piles.

Table 2: Permitted Uses in Industrial and Mixed Use Zones Under the Dartmouth Municipal Planning Strategy

Zone	Permitted Uses
<p>I-1 Light industrial zone</p>	<p>C-3 uses (which includes C-2 business or commercial uses except obnoxious uses and office uses other than local or public offices; also excludes residential uses)</p> <p>industrial uses except obnoxious uses, uses creating a hazard to the public, and uses creating heat, humidity and glare</p>
<p>I-2 General industrial zone</p>	<p>C-3 uses</p> <p>industrial uses except obnoxious uses and uses creating a hazard to the public</p> <p>building height limit: in Burnside: 3 storeys in City of Lakes : 5 storeys</p>
<p>I-3 Harbour-oriented industrial zone</p>	<p>industrial uses requiring direct access to the sea, construction and repair of marine vessels, marine research, handling and storage of bulk container and cargo, recreational uses, uses accessory to the foregoing</p> <p>**any dwelling in existence at the time the by-law came into effect may be repaired or replaced</p>
<p>I-4 Salvage zone</p>	<p>salvage yard, any use accessory to the foregoing</p>
<p>Comprehensive development district</p>	<p>residential uses commercial, institutional and recreational uses</p>

Regulations in Burnside

Burnside Industrial Park has prepared many documents outlining the regulations and guidelines builders should use in the Park. *Burnside Industrial Park Development Guidelines* (no date) and *Burnside Industrial Park Site Planning Regulations* (no date) from the City set out basic standards for builders to follow.

Minimum lot size in the Park is 5000 square ft, although sites of several acres are also available. With certain conditions met, lot coverage may reach 100% of the site; normally buildings would cover less of the lot. If the building does not cover the site, then guidelines require 20 ft. side and rear yards (see illustration). At one time, office buildings in Burnside could not exceed two storeys, but now they may reach 3 storeys.

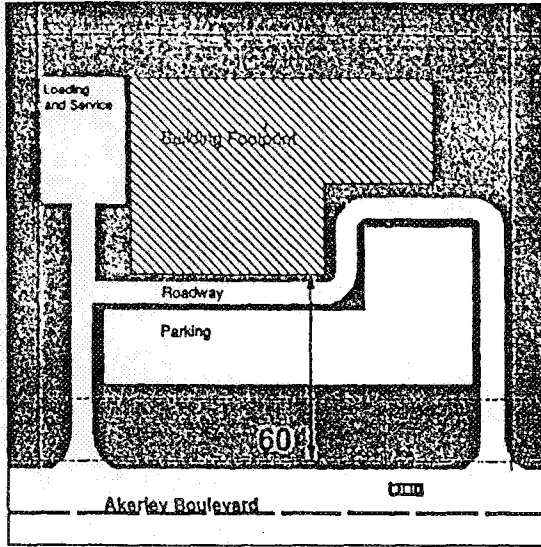
Streets in Burnside come in three widths. Four lane roads are 48 ft wide in a 100 ft right of way (ROW). Two lane roads are either 38 ft (on 60 ft ROW) or 30 ft (on 50 ft ROW). Along Akerley Boulevard regulations require buildings set back at least 60 ft from the road. Other streets have a 40 ft setback.

Summary

In sum, Nova Scotia employs a traditional approach to land use regulation. Of the alternative approaches reviewed in this discussion, only a few seem feasible under existing legislation. Regulatory approaches often reflect the ends governments have in adopting regulations. Nova Scotia land use regulation reflects an attempt to facilitate and promote development while minimizing negative impacts from that development. Sustainable development or affordable housing have not featured among the goals of the province. To adopt new planning strategies to promote sustainable development, we will need to consider some of the alternative approaches available to us.

FIGURE 1

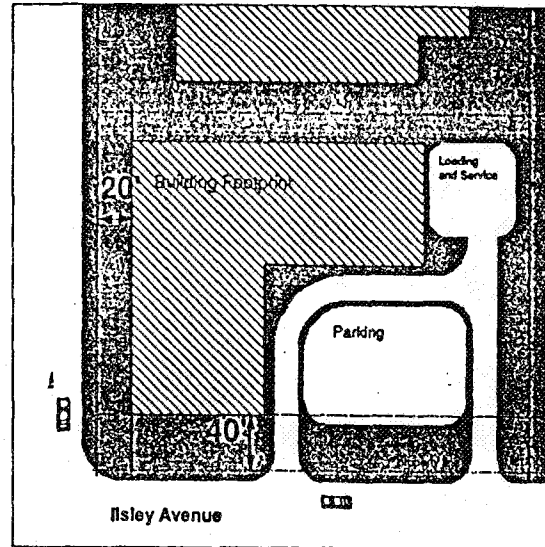
MINIMUM SETBACK REQUIREMENT FOR BUILDINGS ON MAJOR THOROUGHFARES.



City of Dartmouth Site Development and Building Standards

FIGURE 2

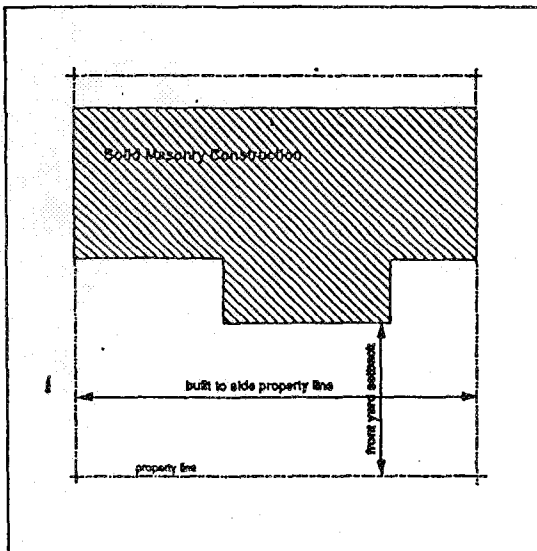
MINIMUM FRONT AND SIDE YARD SETBACKS FOR SITES LOCATED AT THE INTERSECTION OF TWO STREETS.



City of Dartmouth Site Development and Building Standards

FIGURE 3

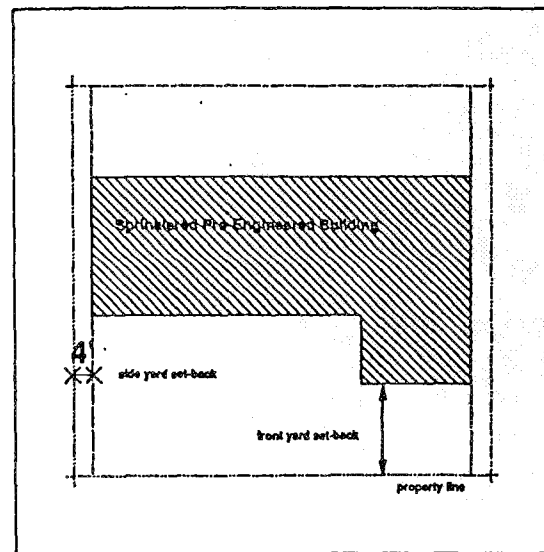
MASONRY BUILDINGS CAN BE BUILT TO THE SIDE PROPERTY LINE IF THE MASONRY WALL IS SOLID WITH NO OPENINGS.



City of Dartmouth Site Development and Building Standards

FIGURE 4

SPRINKLERED PRE-ENGINEERED BUILDINGS REQUIRE A MINIMUM 4' - 0" SIDE YARD SETBACK.



City of Dartmouth Site Development and Building Standards

ILLUSTRATIONS OF REQUIREMENTS
City of Dartmouth, Site Development and Building Standards

FIGURE 8

BUILDINGS OF WOOD FRAME CONSTRUCTION REQUIRE A MINIMUM SIDE YARD SETBACK OF 7'-6".

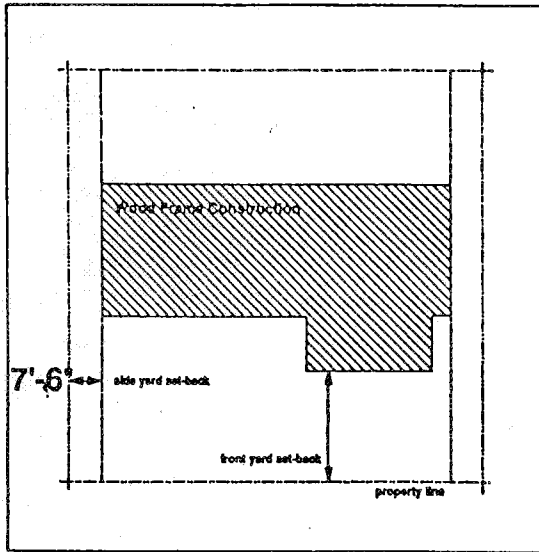


FIGURE 9

PARKING LOT ARRANGEMENT MUST NOT INTERFERE WITH THROUGH TRAFFIC AND MUST PERMIT VEHICLES TO LEAVE IN A FORWARD MOTION.

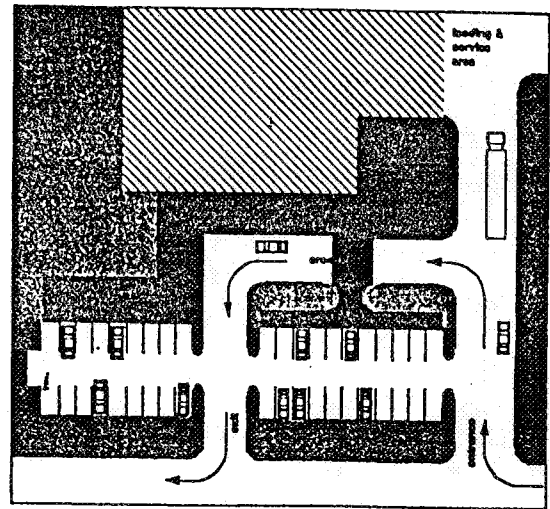


FIGURE 11

CURBS MUST BE PROVIDED TO ENSURE SAFETY BETWEEN PEDESTRIAN AND VEHICULAR MOVEMENT.

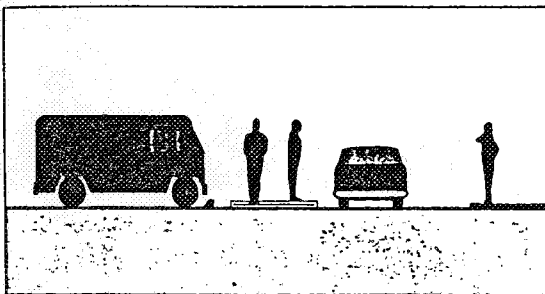
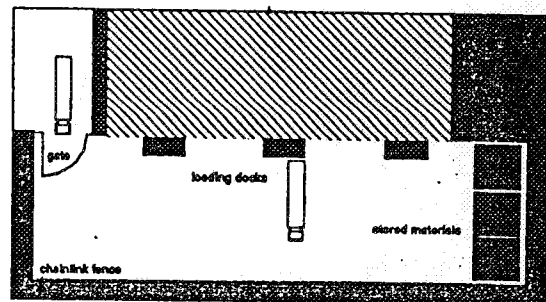


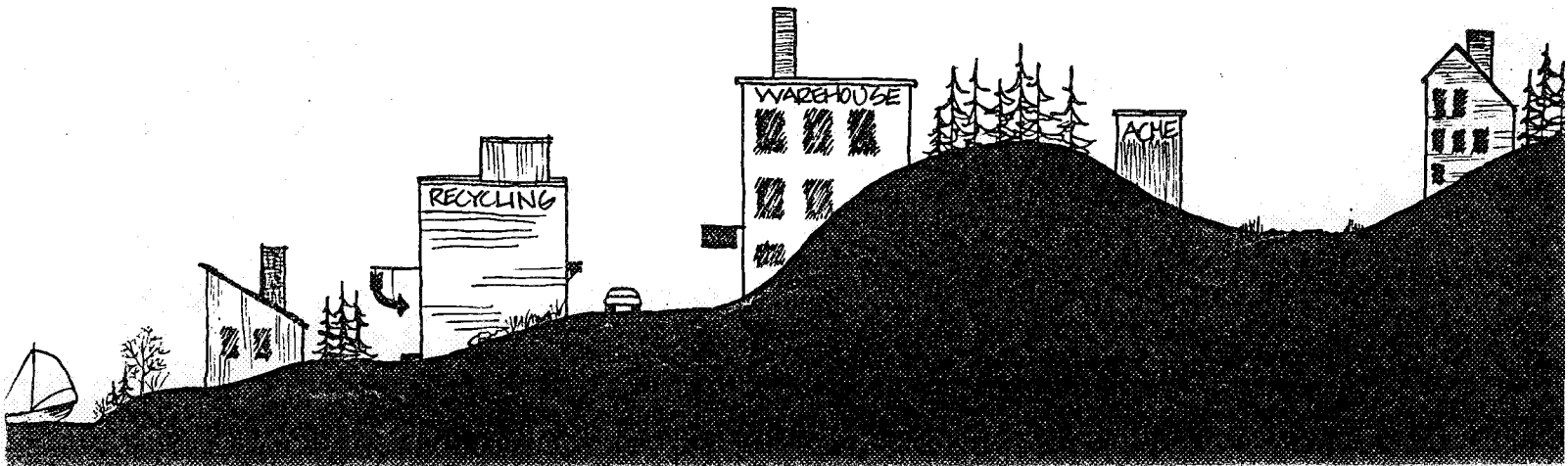
FIGURE 13

LOADING AREAS AND STORAGE YARDS ARE TO BE LOCATED AT THE SIDE OR REAR OF BUILDINGS. FREIGHTAGE AND STORAGE YARDS MUST BE ENCLOSED BY CHAIN LINK PRIVACY FENCING.



SECTION 2: CASE STUDY

In Among the Factories



BURNSIDE INDUSTRIAL PARK: A STUDY OF OPPORTUNITIES

Research Problem

This case study investigates the potential for opening clean industrial areas to residential uses. Sustainable development involves finding ways in which people can meet their needs with minimal disruption of natural processes and functions. We cannot sustain relentless urban expansion that replaces productive indigenous landscapes with modified landscapes. We must, however, continue to find housing for community members.

Housing people in modern industrial parks may prove a feasible option in a sustainable community development strategy for several reasons.

- a) Housing people in industrial parks would allow optimum use of existing infrastructure such as major transportation routes and sewage systems. Service providers, such as restaurants and recreational facilities, could develop potential markets after hours.
- b) Finding space for housing in built-up areas is less expensive than clearing and developing new areas for housing. Modern industrial parks often consist of low-rise structures sited on large lots. Analysis of the landscape and buildings could reveal opportunities for residential construction (e.g., in air space over low-rise buildings, on large lots between buildings).
- c) It seems likely that housing built in industrial areas would consist largely of multi-family rental units offered at affordable rates. The housing would appeal primarily to employees working in the area. Obtaining housing close to work could reduce commuting time and expenses for workers. Employers may derive benefits from having a portion of the work force close at hand (for example, less demand for employee parking spaces).
- d) In contrast to efforts to provide multi-family housing in other parts of a community, we can anticipate less neighbourhood backlash if we add housing in industrial areas. The NIMBY syndrome which has paralysed efforts to build shelter in so many communities should play a reduced role in industrial parks.

We can anticipate several **constraints** to consider in investigating the potential for housing in industrial areas.

- a) While industrial parks can handle the traffic and wastes of a permanent population, they generally do not offer certain kinds of facilities and services. We must consider what effects residential intensification might have on community facilities such as schools and

parks.

b) Despite industry's best efforts to operate safely and cleanly, industrial accidents remain a significant threat in industrial areas. We must determine the risks to assess the viability of congregating residential and industrial uses.

c) Perhaps the greatest constraint on adding residential uses to industrial areas is cultural attitudes. We need to understand whether employers and employees feel that housing could work in an industrial area. We must also consider the possibility that providing housing in industrial parks could lead to greater residential segregation by class (with low-paid workers living in industrial areas).

d) Although maps and photos of industrial parks typically reveal lots of "waste space", careful analysis of the site will reveal where the community could safely add housing to the land use mix.

e) Existing planning regulations and government policies limit opportunities for changing uses. We will need to examine the bureaucratic framework and explore alternative regulatory regimes that communities could consider adopting.

Study Objectives

The project seeks to determine the opportunities and constraints to adding residential uses to the mix of uses in an industrial park. A case study of a large industrial park creates a significant body of data to assess the potential implications in a specific community context. While the results of a case study cannot apply directly to other communities, the general findings offer other communities suggestions about the types of effects they may anticipate and the options they might consider.

We established the following specific objectives and methods.

- * To identify, through analysing site features, under-utilized spaces that could accommodate residential uses.
- * To discover, through interviews with users and regulators of the park, opinions about adding residential uses to the park.
- * To catalogue, through interviews and literature review, potential effects on community infrastructure and services.

* To document, through literature review and interviews, options for alternate regulatory approaches to congregating housing with other land uses in industrial parks.

Our interest in this research project developed from other work undertaken jointly and separately. In analysing sustainable development in residential land use planning we came to recognize that finding ways to house people without modifying indigenous landscapes requires efficient use of existing infrastructure and facilities (Grant *et al.* 1993). Through work exploring "The Industrial Park as an Ecosystem",⁶ we discovered that the industrial park may offer opportunities for residential development that few have considered: for example, space between buildings and under-utilized infrastructure. The preliminary findings of the ecosystem project gave rise to the questions underlying this study of housing in industrial parks. If we hope to have communities function as ecosystems do, with minimal energy inputs and waste outputs, then it makes sense for us to consider new options for living and working.

Study Method

In order to consider the viability of housing people in industrial parks, we conducted a case study of Burnside Industrial Park in Dartmouth, Nova Scotia. Burnside is the largest industrial park in Atlantic Canada. With approximately 1200 businesses in 3000 acres, it has experienced considerable success and rapid growth since the early 1970s. During the 1980s, the office park section of Burnside, City of Lakes Business Park, brought many new office developments to the area. Although the recession of the early 1990s hit hard, driving some businesses out of the park, Burnside remains a major source of revenue for the city.

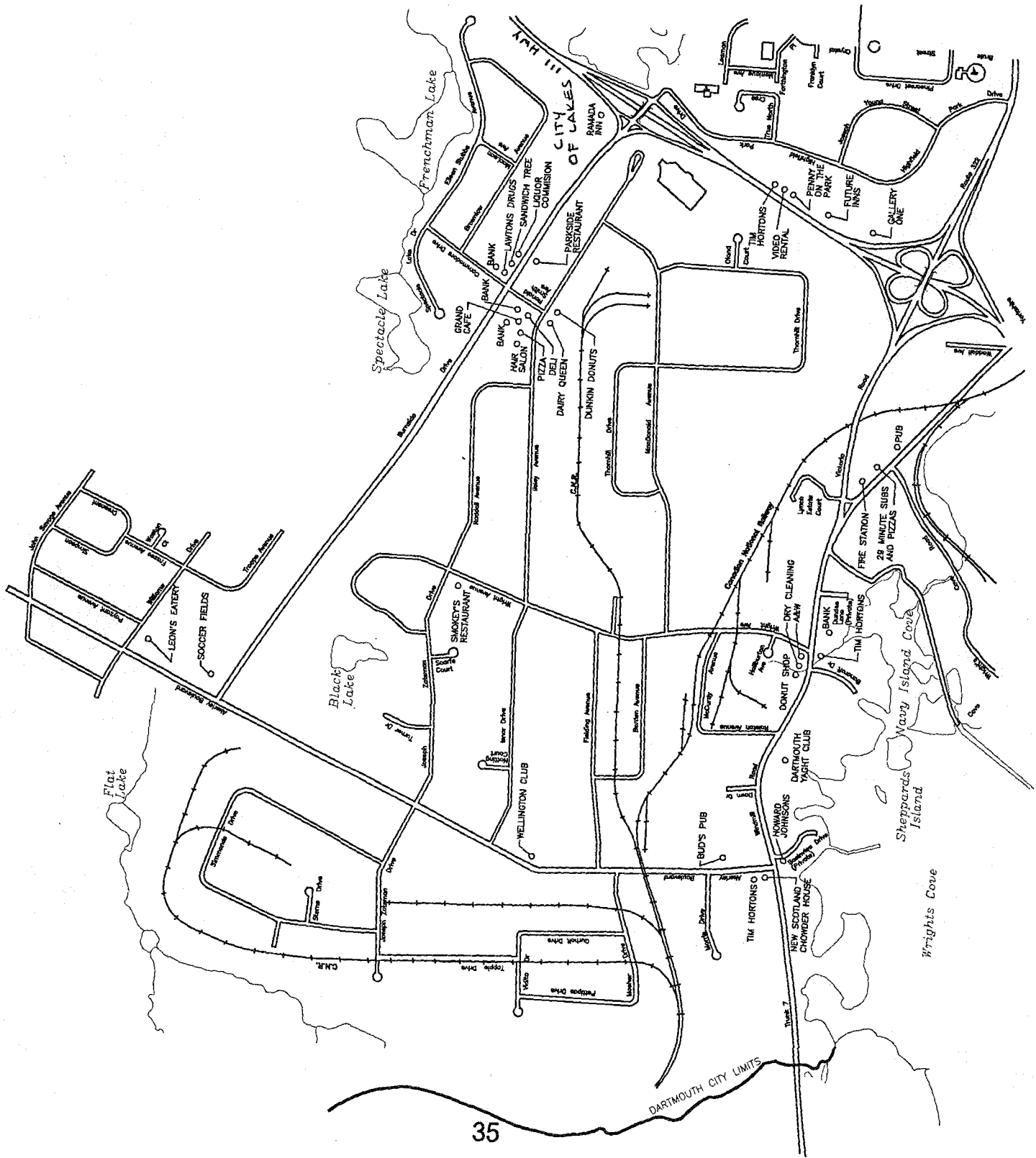
During the 1960s, the federal government tried to address regional disparity by encouraging industrial development in Atlantic Canada. Through agencies like the Atlantic Development Board (ADB), Ottawa provided funds for constructing roads, water, and sanitary sewer systems to service industrial land in the Halifax-Dartmouth area of Nova Scotia. Burnside Industrial Park gained a significant advantage as first off the mark.

Today the park extends from the Circumferential Highway (111) to the City's northern boundary; it includes land east of Windmill Road to 3000 ft eastward of Burnside Drive (see Map 2). Areas east and west of the Park itself have potential for further industrial development in years to come.

⁶ This project, headed by Ray Côté of the School of Resource and Environmental Studies, Dalhousie University, is funded by the Donner Foundation and the Canada - Nova Scotia Cooperation Agreement. The final report on the project should become available in June 1994.

BURNSIDE INDUSTRIAL PARK — SHOWING MAJOR ROADS

MAP 2

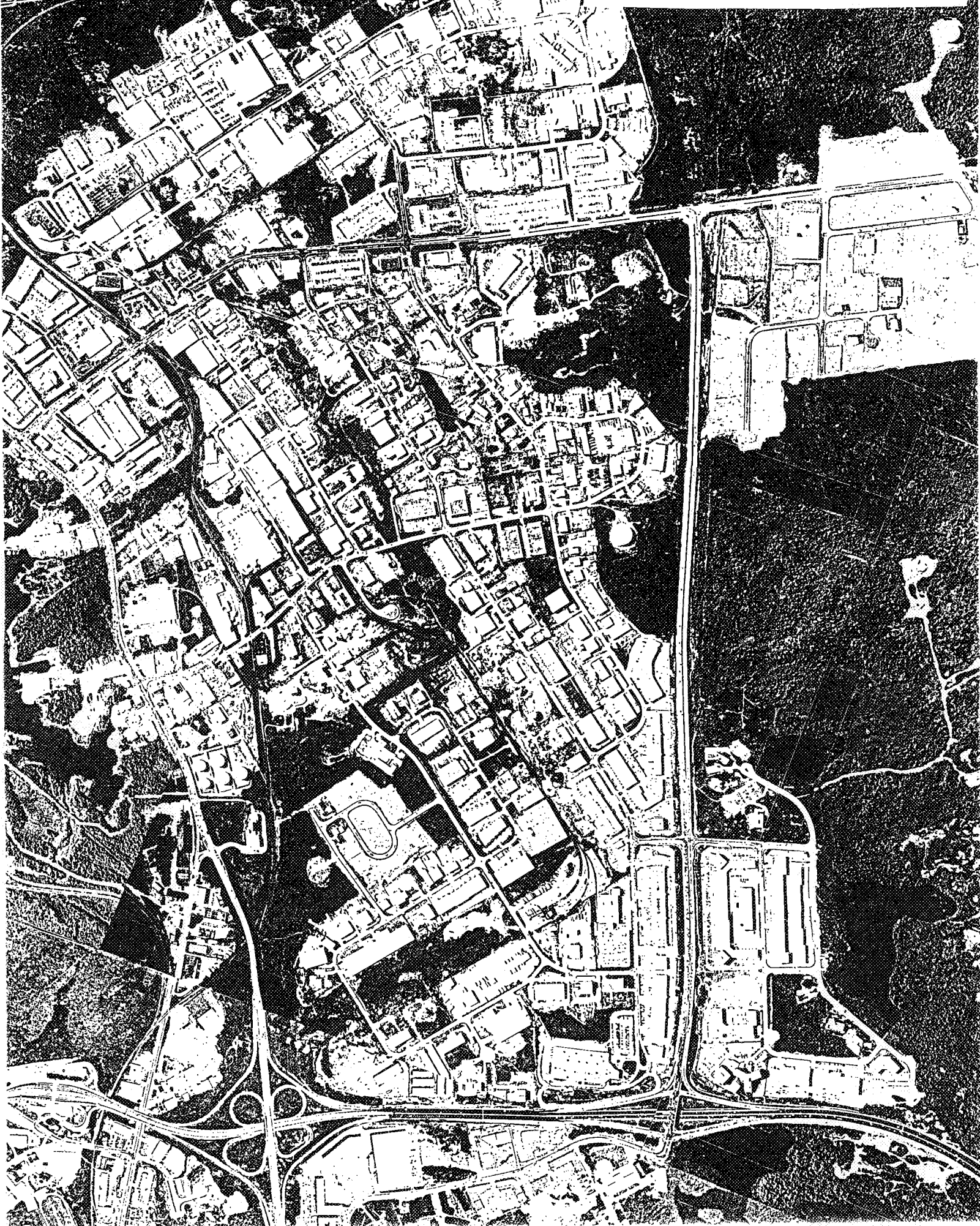


Our case study involved two major components:

- a. analysis of the Park site to look for opportunities for residential infill or residential development, and
- b. interviews with persons knowledgeable about the site or the community to consider possible impacts of residential development.

We conducted the research during the summer and fall of 1993. Site analysis involved work with aerial photographs, provincial mapping information, and site visits. We interviewed planners, municipal staff, council members, business owners, workers, and industrial commissioners (see Appendix for questionnaire). Following site analysis and interviews, we examined particular areas within the industrial park for suitability for housing and developed design concepts to test our ideas.

Aerial Photo Composite of Burnside, 1992



SITE ANALYSIS

Regional Context

The second largest community in Nova Scotia, Dartmouth has a population of over 67,000. Across the harbour from the provincial capital, Halifax, Dartmouth long served as a "bedroom community" for its twin city. The growth of Burnside Industrial Park helped to give Dartmouth a strong economic base of its own.

Until the opening of the MacDonald Bridge to Halifax in the early 1950s, Dartmouth grew relatively slowly. Rapid suburban expansion followed; through the 1960s, 1970s, and 1980s, new homes sprang up along the perimeter of the early city (see figure). In this sense, then, Dartmouth followed the pattern of many cities: growth at the edge; collapse at the centre. Large regional shopping malls along the Circumferential Highway draw commercial traffic away from the downtown. While a residential community remained in downtown Dartmouth, it diminished in size over the years. The downtown now features a small number of boutiques and banks, and many empty stores and schools. Bars (formerly strip clubs) and pawn shops give the area a poor reputation.

Burnside Industrial Park's success contributes to some of the problems of the downtown. After Dartmouth opened the City of Lakes Business Park in Burnside in the late 1980s, businesses had no reason to move downtown: attractive environments and generous parking proved more available in Burnside than downtown. The City commissioned a Waterfront Development Plan for part of the downtown in the mid-1980s; the plan suggested residential intensification to restore vitality to the city centre.

Dartmouth has experienced the same trend as many Canadian communities: urban densities continue to fall with each generation. Staff see lots of potential for infilling within the City boundaries. Dartmouth has no shortage of serviced land for residential development. While housing starts have remained relatively strong, the city has experienced little real growth in recent years.

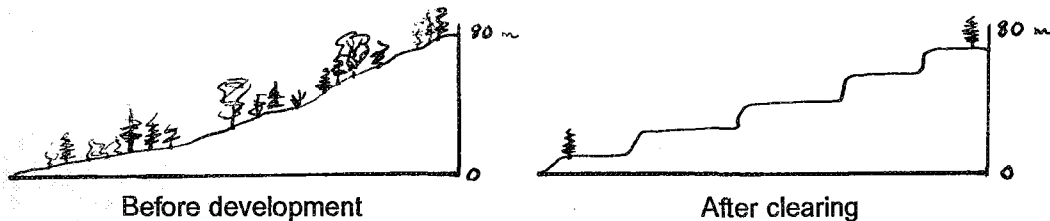
We must recognize that in trying to decide where to focus energy in infilling, communities have to weigh many factors. Each community must ask itself: where does it make the most sense to put people? Downtown? In the suburbs? In the industrial park? For example, even if it proves feasible to house people in industrial parks, that strategy may not prove the best choice for any community. The particulars of each community will influence the choices made.

In this section of the report we discuss the characteristics of Burnside Industrial Park. We begin by describing the physical features of the site and proceed to discuss how people use the area.

Description of Site

In siting Burnside, planners selected a fine south-southwest facing slope with expansive views of Halifax Harbour and Bedford Basin. The land rises from the coast at an average slope of approximately 5% to reach nearly 80 metres above sea level at its highest point. The site spans approximately 3.5 kilometres in one direction and just over 3.1 km in the other direction.⁷

Unfortunately, the Park developers blasted the site clear before preparing building sites (see photographs). Little indigenous vegetation remains, except for a few pockets scattered through the park. Aerial photographs from 1953 show a landscape covered with trees, except for a few disturbed areas. As late as 1968, most of the site remained heavily wooded. During the early 1970s, however, Dartmouth began clearing land for development. Dozers turned vast swatches of land into gravelly terraced plots. Such practices severely impaired original landscape functioning on the site, and obliterated indigenous habitat areas. Although some species have colonized waste spaces in the Park, many undeveloped sites remain sterile or biologically homogeneous.



Climate

The climate of the site reflects cool Maritime conditions (Table 3)⁸. Mean daily temperatures range from -4.8°C in February to 17.9°C in August. Mean annual precipitation is 1370.7 mm. The area enjoys an average of 1949.1 hours of sunshine per year. Winter winds generally originate in the northwest, while summer winds shift to the south-southwest. Mean wind speed varies from 12 km/hr during the summer months to 19 km/hr during the winter months: calm days prove rare along the Atlantic coast.

⁷ Although the City of Dartmouth often gives measures in metric units, much of the information issued on Burnside uses imperial units.

⁸ All climate information reflects 30 year averages for Shearwater (Dartmouth) provided by the Atmospheric Environment Service, Bedford.

PHOTOGRAPHS

Industrial park designers traditionally began by clearing vegetation from a site and then levelling the area for development. The resulting "table top" pattern produced large flat areas. On sloping sites, like Burnside, developers created a "stepped" effect. In the background of the photographs, indigenous vegetation borders the cleared area of the foreground.

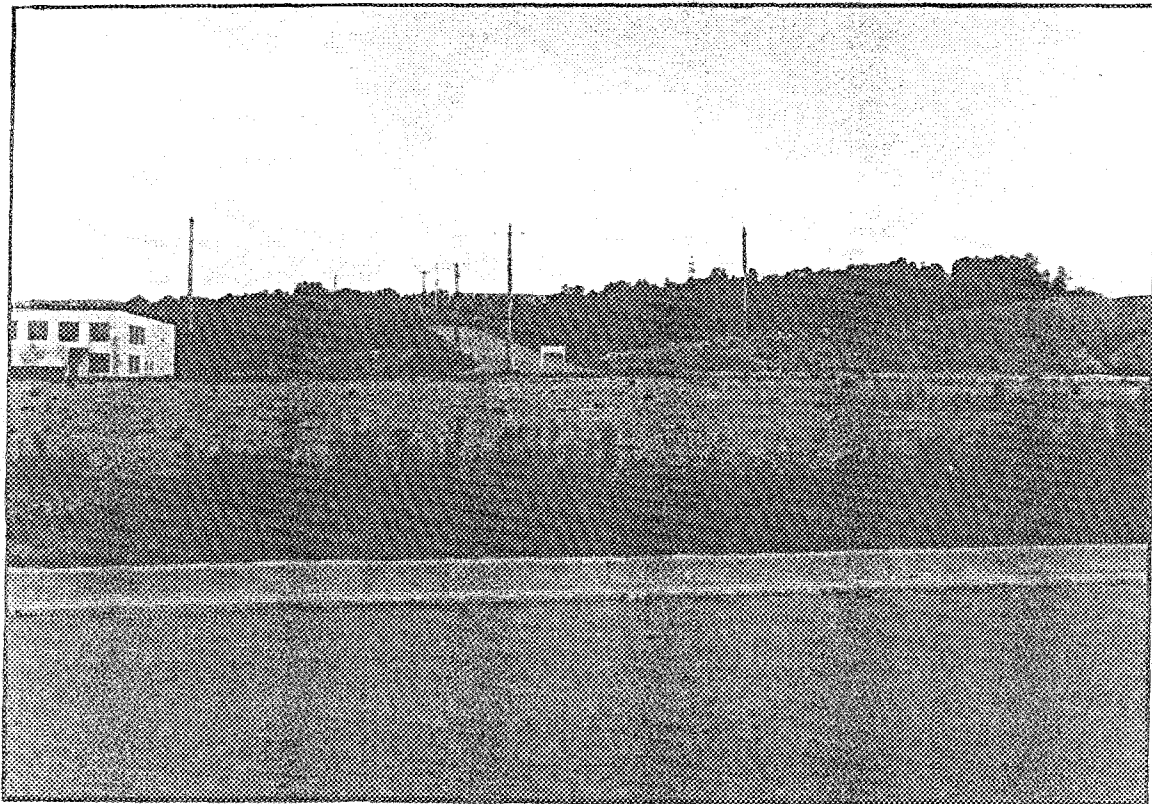


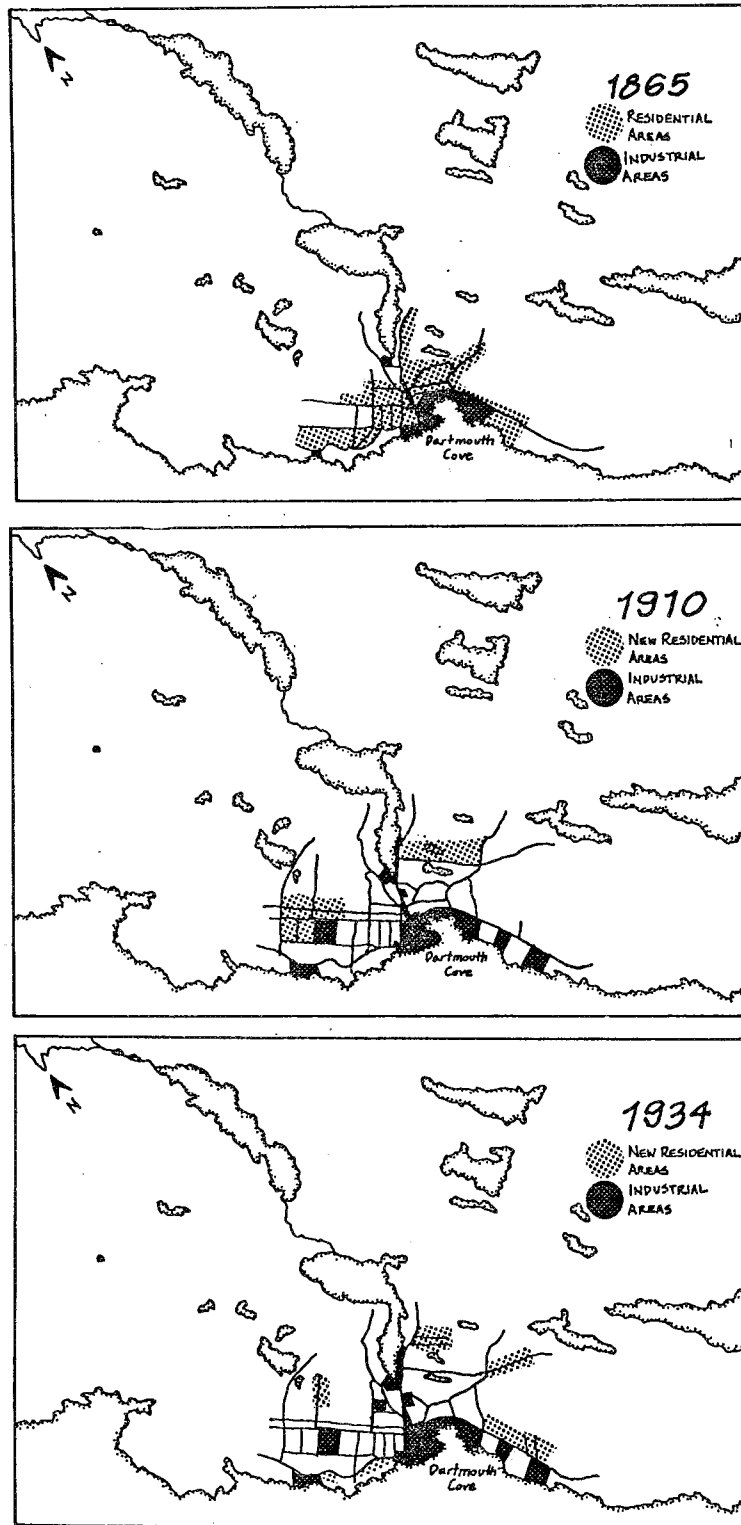
Table 3: Climate Information for Dartmouth from 1944-1990

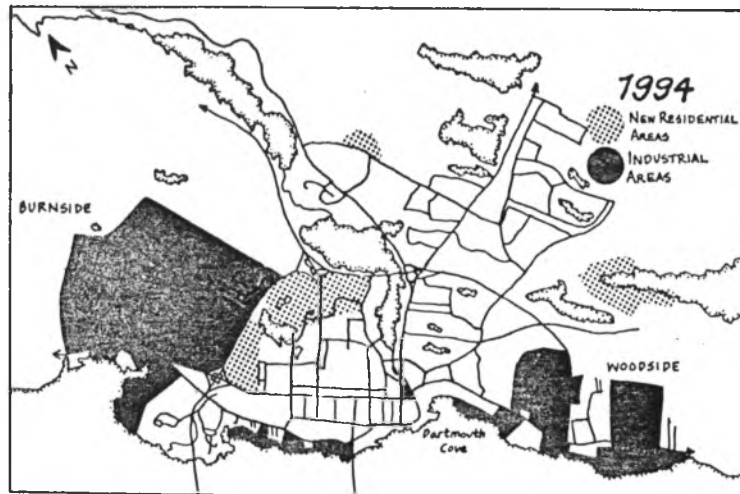
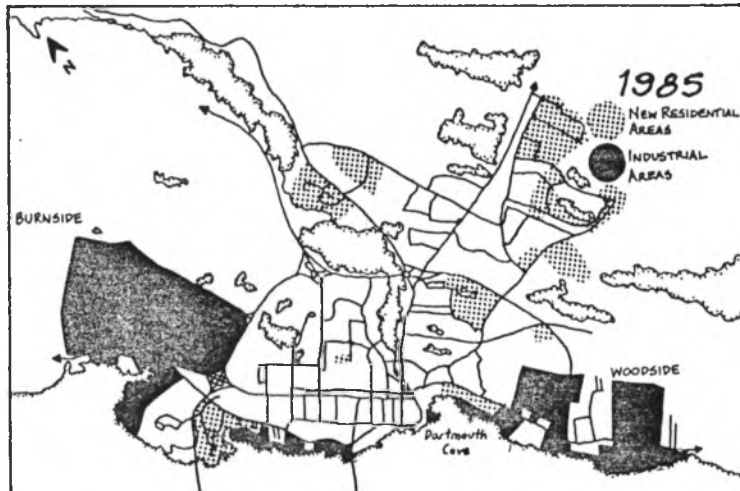
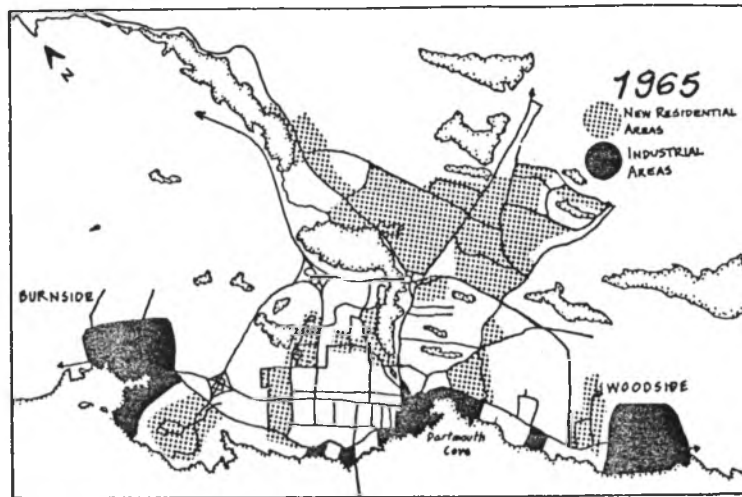
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YEAR
Daily mean temperature(°C)	-4.6	-4.8	-1.0	3.9	8.9	13.9	17.5	17.9	14.4	9.3	4.2	-1.7	6.5
Precipitation (mm total)	128.9	107.4	110.8	110.1	105.0	104.1	97.8	102.6	91.5	121.7	139.9	150.8	1370.7
Hours of sunshine	113.0	129.7	146.1	157.5	199.3	215.2	224.2	224.6	181.5	154.2	107.6	96.2	1949.1
Mean wind speed (km/hr)	19	19	19	18	15	14	12	12	14	15	17	19	16
Prevailing wind direction	NW	NW	NW	N	S	S	S	SW	SW	W	NW	NW	NW
Extreme gust speed (km/hr)	127	146	148	122	106	111	114	93	126	132	121	150	n.a.

[Source: Atmospheric Environment Service. Readings taken from Shearwater Airport: 44°38' N, 63°30'W]

Figure





Dartmouth grew gradually from a small mill town to a large urban community.

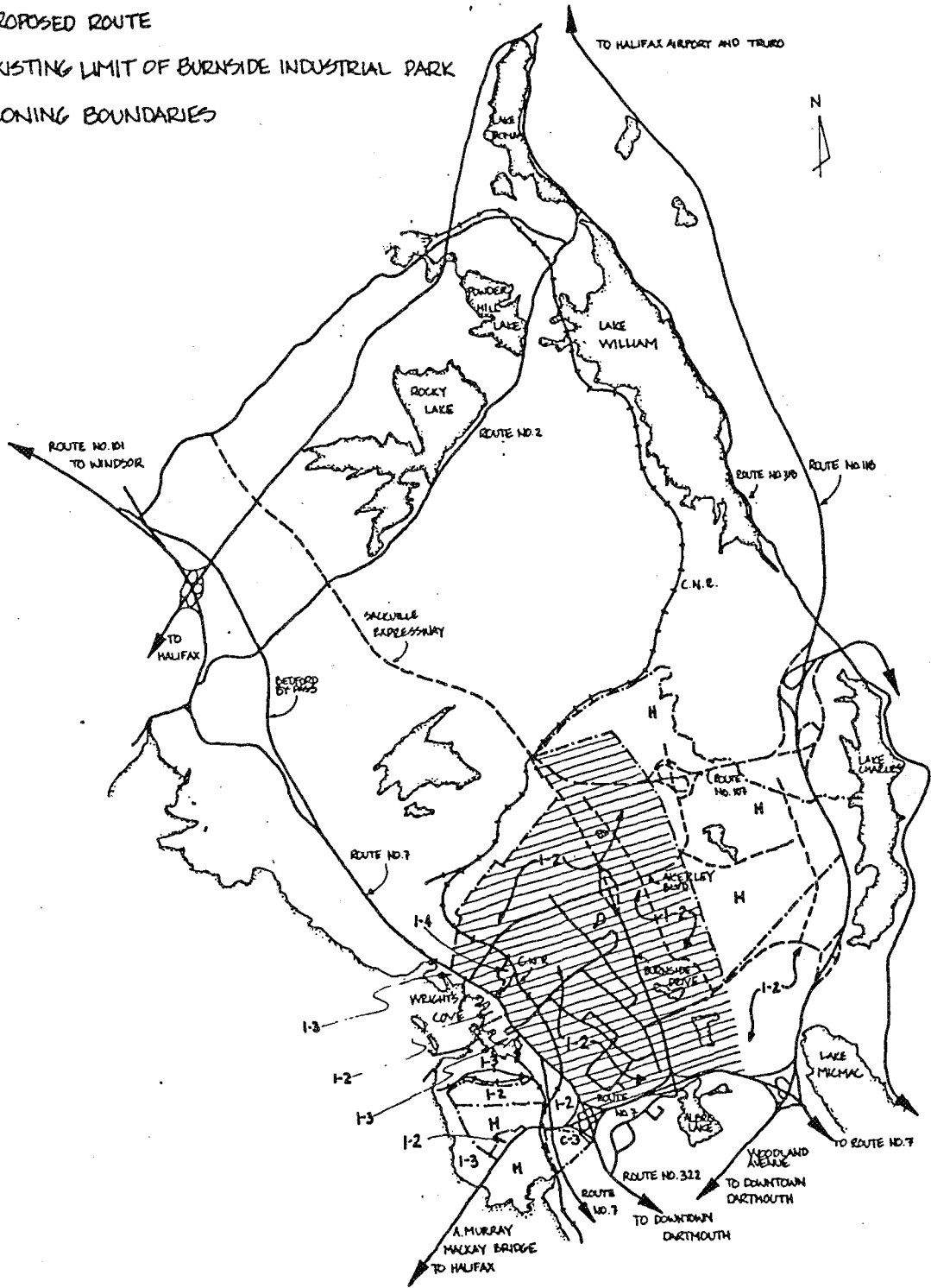




MAP 3

TRANSPORTATION LINKS AND ZONING

-  EXISTING ROUTE
-  PROPOSED ROUTE
-  EXISTING LIMIT OF BURNSIDE INDUSTRIAL PARK
-  ZONING BOUNDARIES



Transportation

Burnside enjoys excellent connections by rail and road with its hinterland area (Map 3). A growing network of highways links the Park to the airport, to the port, to Halifax, and to the major commercial centres of the province. Rail spurs service many areas of the Park. Along the harbour shore, several businesses, including a marina, take advantage of sea access.

The main roads in the Park are the Circumferential Highway running east to west, and Windmill Road running north to south. Windmill Road forms part of Highway 7 from Dartmouth to Bedford and Sackville. The Circumferential Highway connects east-bound traffic from Halifax via the Murray Mackay Bridge to East Dartmouth. Other roads include Akerley Boulevard running east to west, and Burnside Drive running north to south. Both roads will eventually extend to meet Highway 107 to Sackville. The remaining street layout includes secondary roads and cul-de-sacs.

Substantial parking and setback requirements mean that many sites have large parking lots in front of buildings. Accordingly, one derives a sense of spaciousness along the main roads; unfortunately, the layout focuses attention on the degree to which the automobile drives design in this environment. Large distances and vast parking lots separate buildings. Pedestrians feel out of scale.

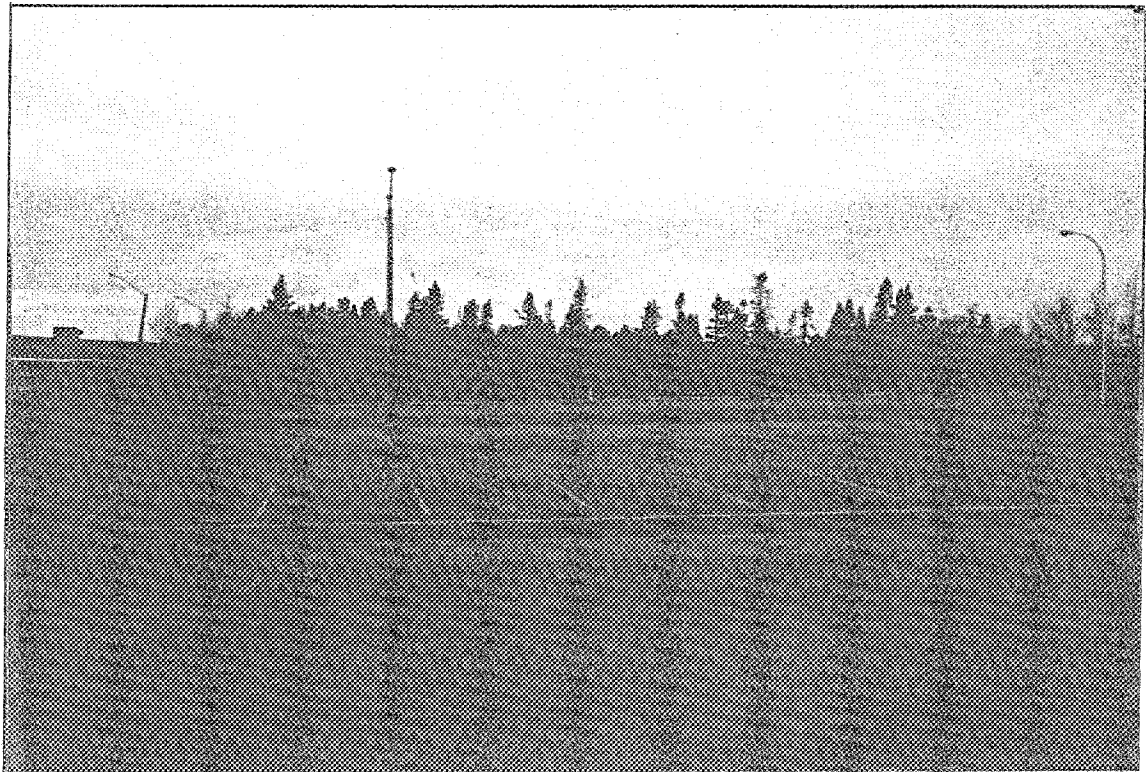
Burnside was not designed to accommodate foot or bicycle traffic. Few roads have sidewalks. Most of the roads leading into the Park either prohibit or discourage people from walking or cycling: for example, although sidewalks lead toward Burnside from Highfield Park to the south of the Park, they end abruptly at the highway; the highway overpass has no sidewalk and prohibits cyclists. It's illegal to walk or cycle to the Park from residential areas. Nonetheless, some people do come to the Park without automobiles. Several Metro Transit bus routes serve the area. In some places, pedestrians have worn foot-paths from bus stops to their destinations.

Truck traffic is heavy in the Park, as expected in an industrial zone. Wide roads encourage traffic to move quickly throughout the area. Park planners evidently designed the road system to move traffic smoothly and easily through the Park.

The railway system consists of a CN main line running into the Park from downtown Dartmouth along Highway 7. No passenger trains stop in Dartmouth. The line travels through the Park along Windmill Road to North Dartmouth. Secondary lines branch off the main line servicing an area west of Isnor Drive and Ilsley Avenue, and an area north of Akerley Boulevard. Eleven level railway crossings equipped with warning signs, lights, or bells (or a combination of all three on major roads) operate in the Park. No fencing separates many lots from the rail lines. The speed limit for trains on the main line is 25 km/hr, and 10 km/hr on secondary lines.

PHOTOGRAPHS

Park designers built Burnside for automobiles, not for pedestrians. Wide roads, huge parking lots, and no sidewalks indicate that planners expected most visitors to arrive by car.



Infrastructure

When Dartmouth began developing Burnside Park, it provided water, sewer, and power connections suited to industrial uses. Water services can support 4000 gallons per acre per day. In 1992, the City indicated that it supplied approximately 320 million gallons to the Park, less than one-quarter of the designed capacity. Water, sewer, and power supply all prove capable of sustaining higher demand than Park users currently make on those services. Expansion of the Park to areas east of Burnside Drive will increase demand on infrastructure somewhat. It appears, for example, that industrial consumption of water in the Park has generally not reached anticipated levels. Only a few industries in the Park are major users of water.

Zoning

Zoning in Burnside reflects the primary industrial focus of the Park. Burnside presents an exclusive industrial enclave for clean non-obnoxious industrial uses. Any activities that may "conflict" with industrial uses are prohibited, as is common in post-war zoning in Canada. Hence we find that regulations do not allow residential uses or activities commonly associated with residential neighbourhoods.

I-2 zoning (general industrial zone) found throughout most of Burnside Industrial Park and City of Lakes Business Park permits light industrial enterprises, warehousing and distribution, and general business enterprises (Map 3). The industrial zoning excludes "obnoxious" uses. An I-4 zone (salvaging zone) covers a storage yard located beyond Dawn Drive, east of Windmill Road. Coastal areas west of Windmill Road are designated I-3, marine industrial.

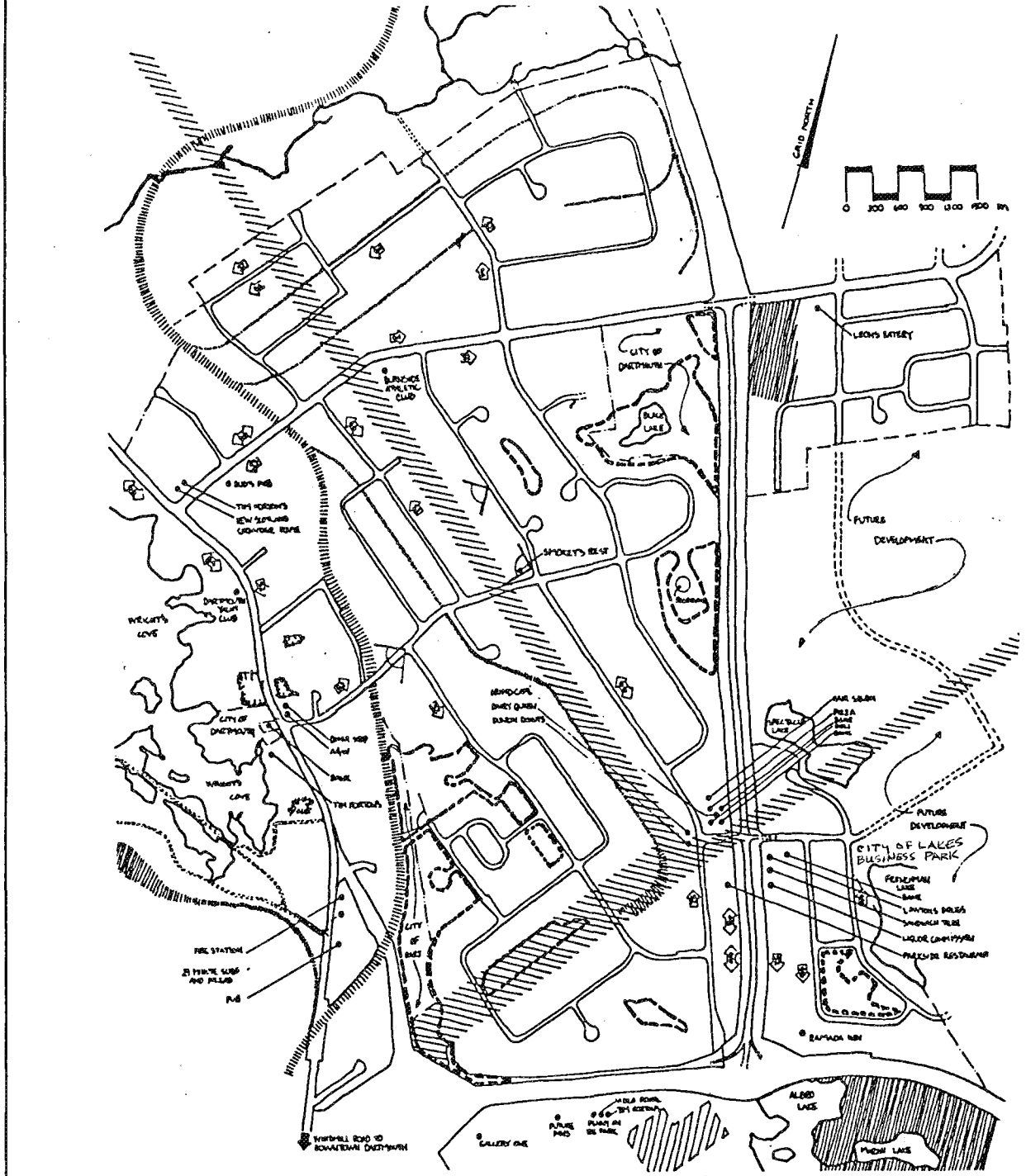
Land zoned for industrial use returns higher tax yields to the city than does residential land. Dartmouth sets its residential mill rate at 1.632, while its industrial mill rate is 3.570. In addition, Dartmouth levies a business occupancy tax and a machinery and equipment tax on businesses. Clearly, Council prefers industrial uses over residential uses. Taxation policies connected to zoning may limit the viability of congregating residential uses with industrial ones.

Activities In and Around Burnside

Over the years many services, such as restaurants and banks, have gravitated towards the Park to meet the needs of workers (Map 4). A health club and soccer fields serve not only those who work in the Park, but other Dartmouth residents as well. Warehouse retail outlets have opened within the last decade, expanding the commercial potential of the Park.

EXISTING CONDITIONS, SERVICES, AND AMENITIES

- ////// NOVA SCOTIA POWER RIGHT-OF-WAY
- |||||| CANADIAN NATIONAL RAILWAY RIGHT-OF-WAY
- == PROPOSED ROAD
- ◊ TRANSIT ROUTE
- ⊗ WETLANDS
- ⊗ INDIGENOUS VEGETATION
- ⋯ GRAVEL ROADS
- △ VIEWS
- /// RECREATION
- ▨ ELEMENTARY SCHOOL



Some companies in the Park engage in activities that create odours, unsightly storage piles, or periodic noise. If the Metropolitan Authority proceeds with its plan to build a solid waste incinerator in the north eastern section of the Park, odours and traffic volumes could increase considerably. At this point in time, it is difficult to predict the effects of an incinerator on the attractiveness of Burnside for businesses or for residents.

Burnside is within reasonable walking distance of an elementary school, John McNeil, in north Dartmouth. (Unfortunately, no sidewalks link the Park to the school.) With the proximity of highways, Burnside has easy access to the network of hospitals, universities, and government services in the metropolitan area.

Buildings and Businesses in Burnside

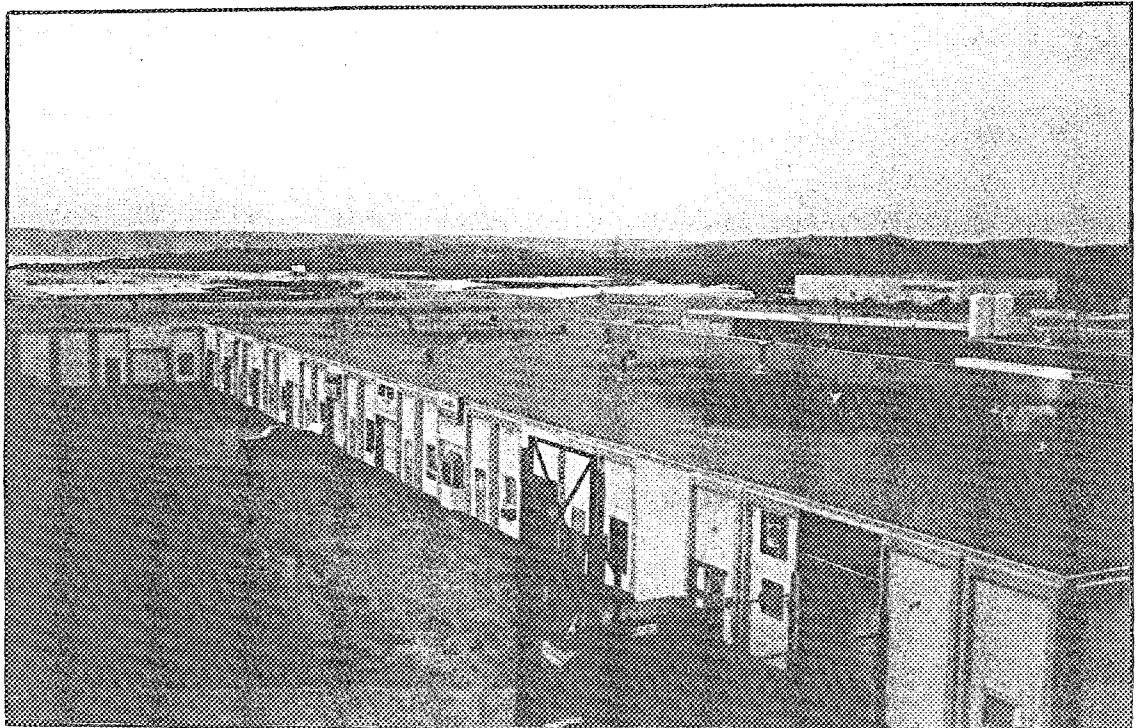
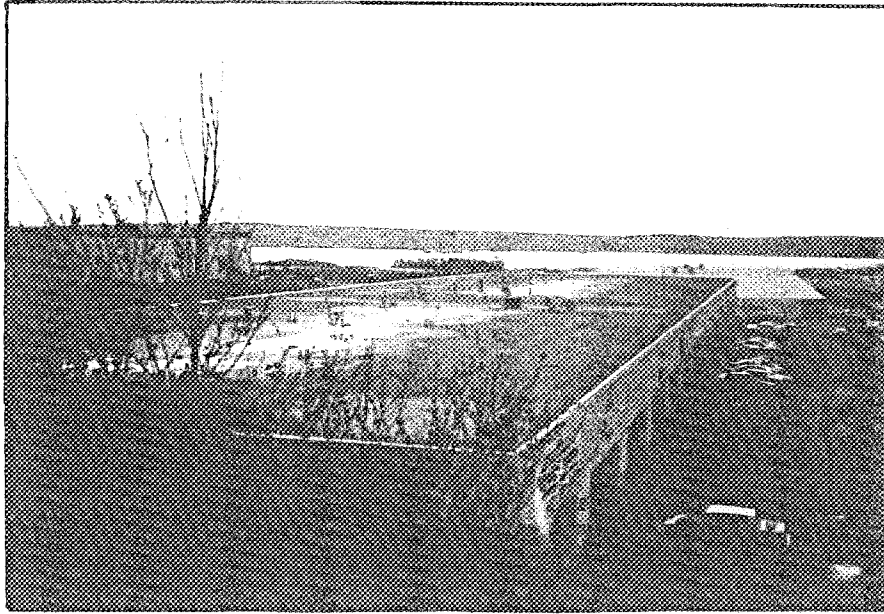
Most of the buildings in Burnside are one to two storey metal or pre-fab concrete. Many have relatively few windows and take little or no advantage of passive solar heating opportunities. Several have large warehouse spaces only partially heated. Few buildings appear to have large central air-conditioning or heating plants. Although office areas are heated, small units meet summer air conditioning needs. While some potential for heat recovery may exist, circumstances may limit opportunities for capturing excess heat for alternative uses. Larger amounts of heat may prove available for recovery and sharing where certain kinds of manufacturing activities occur. For example, food processing activities typically generate heat as a by-product. Co-locating businesses or other activities that can take advantage of the recaptured heat can save energy.

Low rise development in structures with flat roofs would seem to leave large air spaces available for alternative uses. Rooftops in Burnside hold acres of flat spaces with wonderful views of the Bedford Basin. Unfortunately, most buildings in Burnside were not constructed to tolerate loads on their roofs. Common construction techniques mean that buildings can accept snow loading, but no more. Had builders adopted alternative (more expensive) technologies during construction, then owners could add other uses to the roof.

Until relatively recently, buildings in the Park could not exceed two storeys; rules now permit three storeys. Allowing multiple storey buildings may generate some energy savings since long low structures rarely prove as energy efficient as the same square footage in a multi-storey structure.

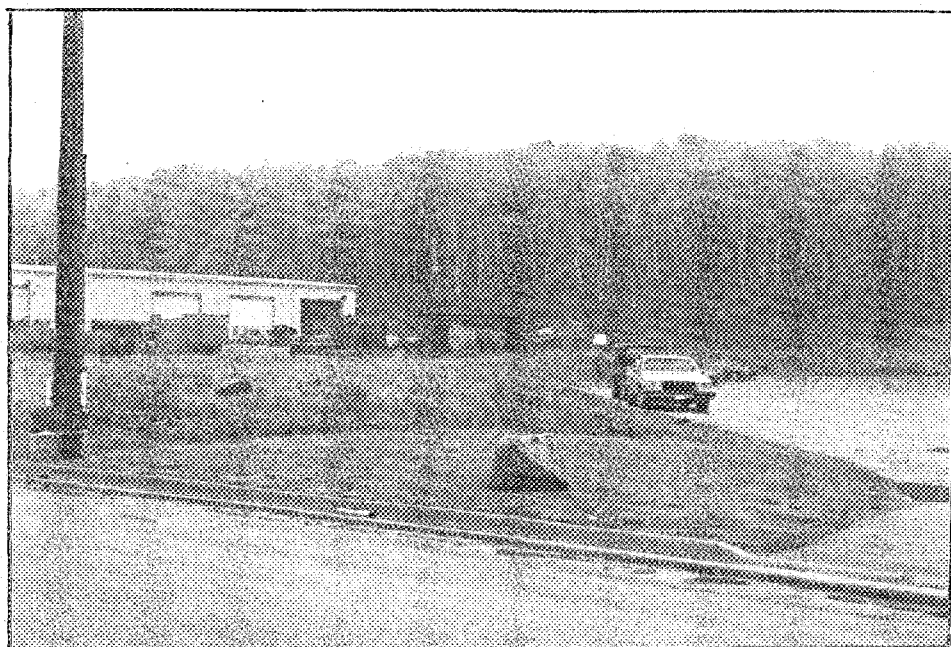
PHOTOGRAPHS

Many buildings in Burnside have large flat roofs with expansive views to Bedford Basin. Unfortunately, most buildings in the Park cannot tolerate the weight of rooftop additions. Companies which recognize the potential for more efficient use of space, and for meeting the housing needs of workers, might consider investing in buildings with the flexibility to adapt to changing circumstances.



Fire insurance regulations have encouraged builders to put several small buildings on some lots⁹. This practice leaves small unused areas between structures. In some areas, nearby buildings duplicate loading zones and parking areas. Alternative site planning techniques could obviate some of the apparent "waste".

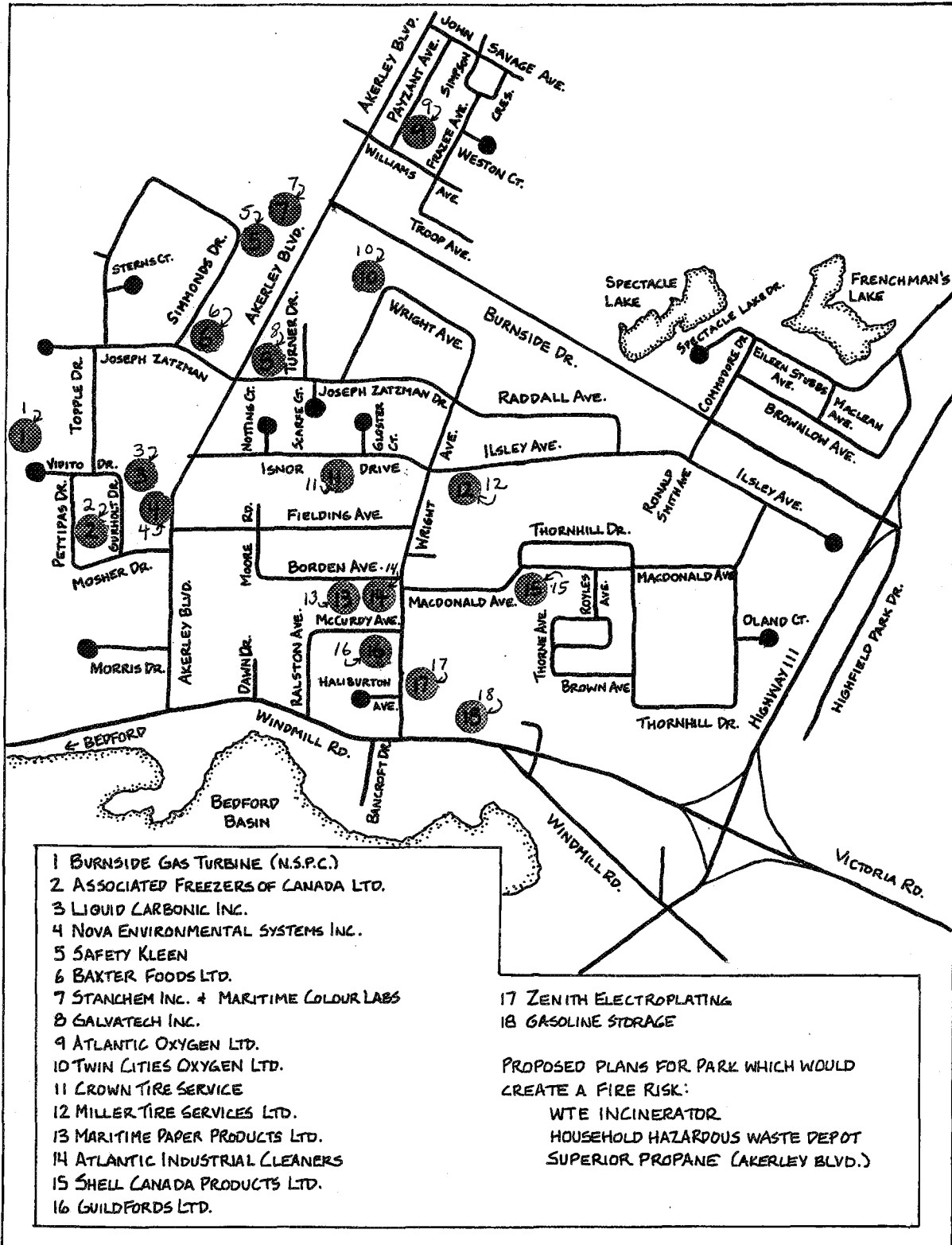
A wide variety of businesses operate in Burnside. While many are benign in their nature, a few use or produce hazardous materials: for instance, several battery companies operate in the Park. Many plants store materials and wastes in their yards. Opportunities for congregating uses will depend in part on the character of various uses on adjoining properties. On the one hand, companies which can use the by-products of other companies would make excellent neighbours; on the other hand, housing could prove poor neighbours to some manufacturing enterprises.



Many companies store scrap materials and unused equipment outside their buildings.

⁹ Buildings above certain sizes need expensive sprinkler systems, for example.

FIRE RISKS IN BURNSIDE



OPPORTUNITY SPACES

As we examine the landscape in the Park, we find many pieces of land that are not used intensively. Some of those spaces may prove suitable for residential development.

For purposes of analysis, we defined the following as "areas used intensively":

- buildings with occupants
- wild or indigenous habitat areas
- staff parking areas
- normal daytime customer parking requirements
- loading areas
- storage areas currently in use

We define the following as "areas not used intensively":

- vacant buildings or lots
- road way in excess of normal daytime requirements
- overflow parking areas
- slopes between buildings
- space over buildings fewer than three storeys in height
- pits or unused storage areas

In order to determine whether currently under-utilized areas offer options for alternative uses, we had to define what we consider "opportunities". If local opposition to alternative uses or in-filling occurs, then perceived opportunities may not prove viable. If alternative uses face undue impacts, then opportunities prove illusory.

Traditionally, industrial parks featured sprawling low-density development. Many companies intentionally select large sites to leave room for later expansion, or because they seek some distance from neighboring uses. Park planners encouraged sprawling development by enforcing spacing standards that create a wide-open impression. As a result, the built landscape is used quite inefficiently, with large empty patches between buildings. Energy and servicing costs prove extraordinarily high in such an environment.

A student member of the research team examined Burnside during the summer and fall of 1993 to consider the potential for intensifying industrial uses (Oredugba 1993). After studying the site and interviewing business owners, workers, and site users, Oredugba concluded that some intensification could occur. His analysis demonstrated that most business owners felt parking, loading, and storage areas were not under-utilized, even if they were needed only on rare occasions. Oredugba found, however, that with greater cooperation between neighbouring businesses, some sharing of parking and loading areas could reduce the total amount of paved surface in the Park.

Many of the roads in Burnside are quite wide. Given the size of transport trucks moving through the area, it would not be safe to reduce street widths. However, on-street parking could prove feasible in some areas. This would reduce the need for over-sized parking lots for retail businesses.

Oredugba found almost 600 acres of land potentially available within Burnside West (the area west of Burnside Drive) for new users. Existing conditions constrain much of the potential, however: for example, the 59 acres of rooftops is not generally buildable because most structures cannot tolerate rooftop extensions. However, builders could use the 58 acres of vacant lots prepared for development. Abandoned buildings and lots total 11 acres; some buildings offer potential for re-use, but some sites will need cleaning before new tenants move in. The Nova Scotia Power Corporation easement through the Park accounts for 470 acres which could accommodate new development in some areas.






Unfortunately, Oredugba did not calculate the acreage of opportunities between industrial buildings; current regulations and property ownership patterns would make infilling difficult to achieve. He also notes that areas between and around buildings often provide amenities for workers and customers. For example, landscaped areas may shelter buildings from cold winds, provide visual access for drivers and pedestrians, or offer summer lunching spots for workers.

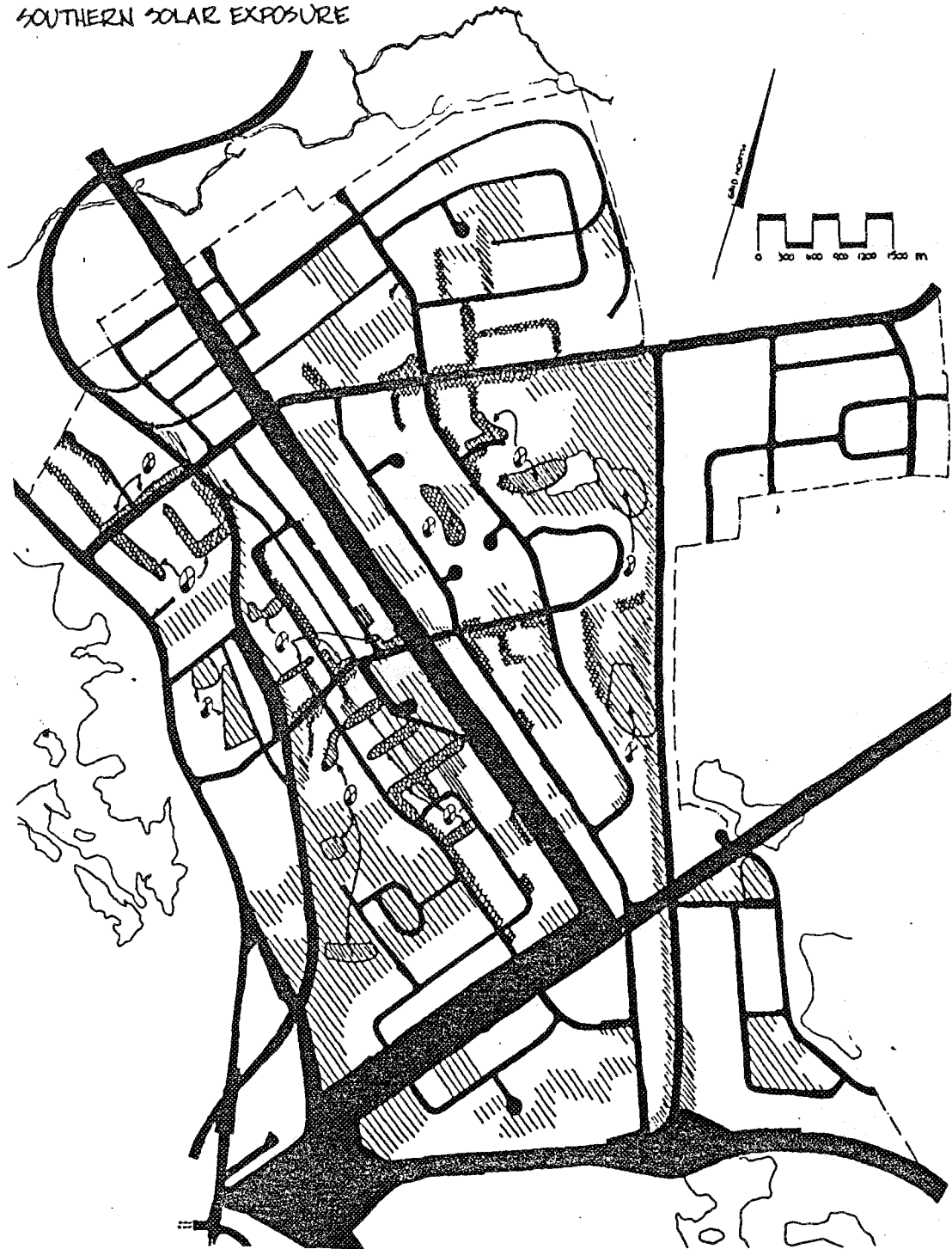
Whether under-utilized spaces in the Park provide opportunities for housing depends on a number of factors. The study team hypothesized that opportunities for in-filling housing may appear given certain conditions.

- * Amenities and services
where necessary amenities and services are available for occupants
- * Minimum dimensions
where the landscape offers sufficient space for a small community of residents to locate in close proximity
- * Safety
where occupants will be safe from hazardous uses, loud noises, noxious odours, and heavy traffic
- * Economy
where economic conditions create a viable market for housing near work places

Table 4 sets out the criteria we identified as suitable to use in determining the feasibility of providing housing. We decided to consider a variety of housing forms, from single detached to large apartment buildings.

MAP 6
OPPORTUNITIES FOR ALTERNATIVE USES

-  EXISTING INFRASTRUCTURE
-  0-8% SLOPES
-  9-25% SLOPES
-  26% SLOPES AND GREATER
-  SOUTHERN SOLAR EXPOSURE



To identify areas which may provide opportunities for housing, we first investigated whether site services could accommodate residential uses. Clearly, given the capacity of infrastructure in the Park, even a considerable amount of residential development should not burden the system¹⁰. Some amenities, such as proximity to schools and parks, are limited to the south eastern portion of the site.

Next we began to identify areas where conditions created spaces large enough to accommodate residential pockets of 30 or more dwelling units (see Map 6). We wanted to ensure that the residential cluster would enjoy sufficient critical mass to allow socializing among neighbours. It proved difficult to find authorities who offered definitive answers on the question of minimum pocket size. Knack (1990a) quotes Randall Arendt as saying 30 households seemed a viable lower limit for a cluster of homes (Yaro *et al.* 1993). Sites of 3 acres or more would prove large enough to give a residential feel in an industrial context: that became our minimum pocket size.

We decided that residential areas needed a minimum dimension of 80 ft from the nearest industrial building. This limit comes from the standard spacing of homes on a suburban street. With a 35 foot road width, and front yard setbacks of 25 ft, the common distance between facing houses is 80 feet. We hypothesized that residents would feel comfortable with a similar minimum distance to the nearest industrial structure. Setting safety distances proved more difficult. One hundred feet clearances from various hazards seem common. We decided, however, that communities should keep residents well clear of hazardous facilities: hence we set a 500 ft separation.

Studies indicate that residents feel more positive about accommodations when they have some private open space (Vischer 1984) and when they have private ground entries (Leung 1993). Residential neighbourhoods must also provide adequate public open space to meet people's recreational needs.

The siting criteria take account of solar access to ensure energy efficiency. Careful attention to site conditions protects landscape function and safety. Siting residences within walking distance of transit routes and principal facilities will provide conditions in which people can leave their cars at home. Site planning for physical access ensures that all members of the community can find housing opportunities in the development.

¹⁰ We should recognize, however, the possibility that new industries which place heavy demands on infrastructure resources, such as water, could purchase sites in the Park at some point in the future. In that scenario, our assumptions about the availability of water for residential uses, or for other industrial uses, could be challenged.

Table 4 : Criteria for residential pockets

AMENITY	REQUIREMENTS
residential pocket "critical mass"	*30 units minimum in cluster *3 acres minimum size parcel
heterogeneous community	*mix of housing types at least 10% single detached at least 30% town houses at least 30% walk-up apartments
private open space	*every unit will have some private open space (balcony, patio, or yard)
solar access	*every unit will have access to southern exposures for passive solar heating
ground related	*at least 50% of units will have private entry at ground level *three storeys maximum
distance from industrial structure	*free-standing residential units no closer than 80 ft to nearest industrial structure *residential units on top of industrial structures should enjoy uninterrupted view 80 ft from their sitting room windows
safety	*residential units will be no closer than 500 ft to areas or uses deemed "hazardous", or 100 ft from dangerous intersections, power lines, or railway lines
site suitability	*slopes between 0% and 8% most desirable, over 8% only if slope stability assured (and with special housing design)
access for physically challenged	*all public facilities shall be accessible; at least 10% of the units shall be accessible
public open space	*at least one acre of park for 1000 residents
pedestrian oriented	*all residences within 200 ft of bus stop; walking distance to elementary school

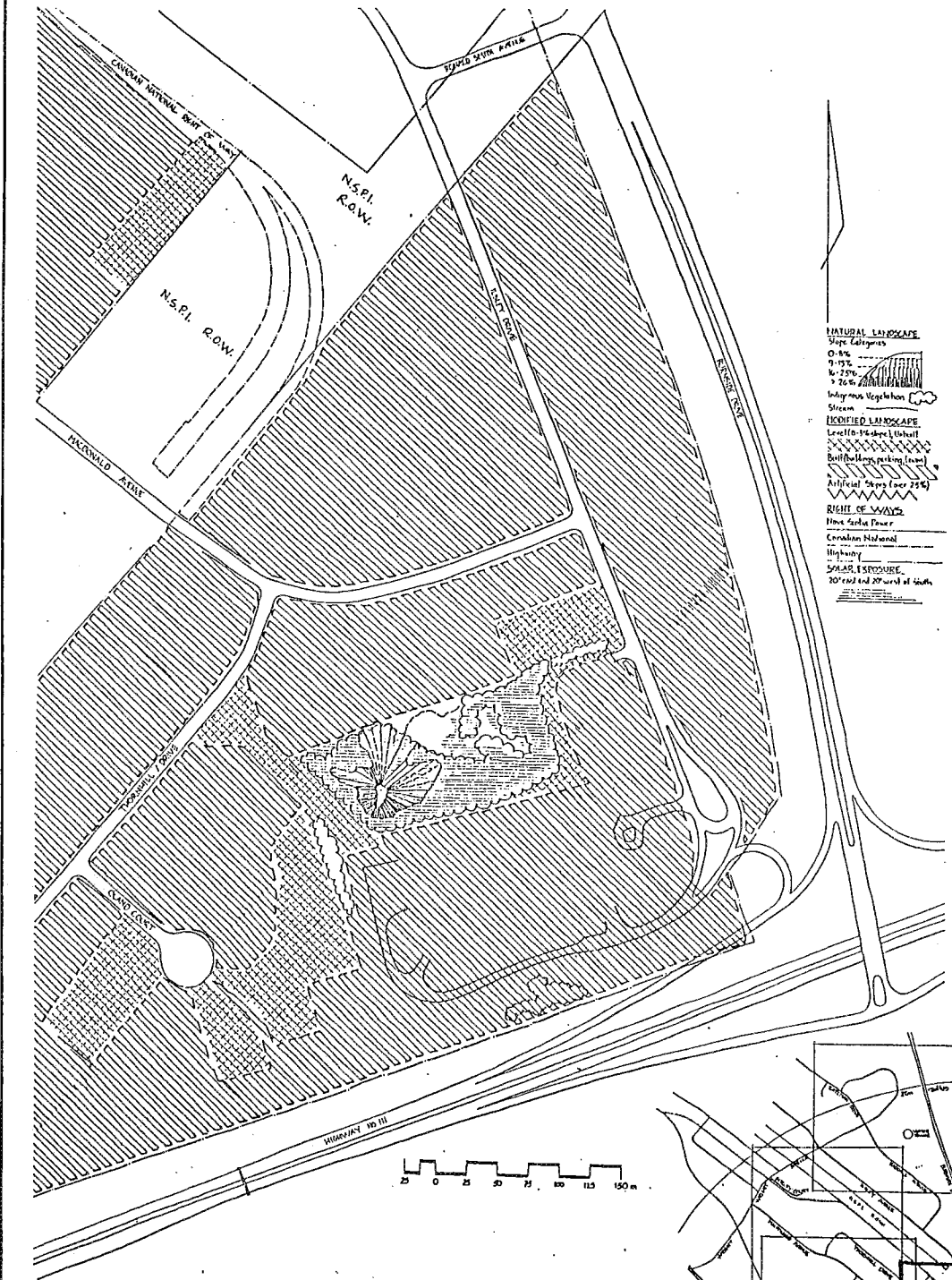
With these criteria in hand, we looked for suitable sites within a two kilometre radius of the nearest school¹¹. Maps 7, 8, 9 and 10 illustrate our detailed analysis of parts of the Park within the radius. The analysis revealed suitable sites of varying size. Some appear suitable because they are currently undeveloped or vacant. For example, several inter-connected lots off Oland Court (Map 7) offered a small parcel near the bus terminus and quite close to the elementary school: this became test site 1. A large area of cleared land and scrub land around Thorne Avenue (Map 8) became test site 2. We subjected those two test sites to detailed analysis to determine their suitability for housing.

¹¹ In Dartmouth, students living within 2 km of school must walk to and from school.

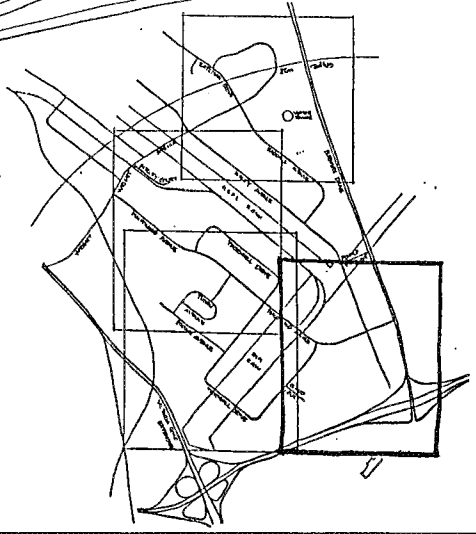
MAP 7

DETAILED SITE ANALYSIS

Burnside Drive at Highway 111



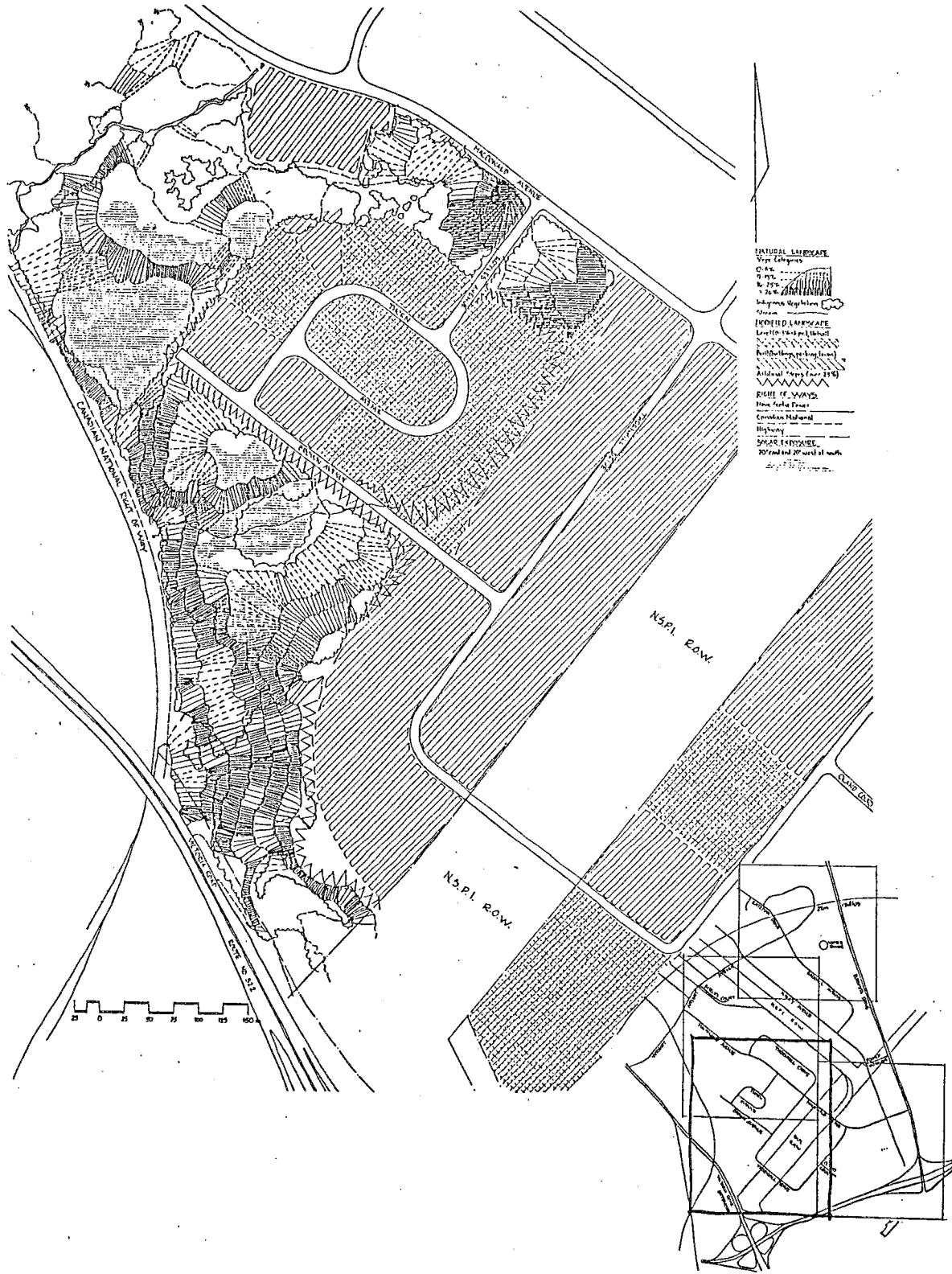
- NATURAL LANDSCAPE**
 Slope Categories
 0-8%
 9-19%
 20-29%
 30-39%
 40-49%
 50-59%
 60-69%
 70-79%
 80-89%
 90-99%
 Steep
 Intermittent Vegetation
 Stream
- MODIFIED LANDSCAPE**
 Level to 34 degrees
 35-39 degrees
 40-44 degrees
 45-49 degrees
 50-54 degrees
 55-59 degrees
 60-64 degrees
 65-69 degrees
 70-74 degrees
 75-79 degrees
 80-84 degrees
 85-89 degrees
 90-94 degrees
 95-99 degrees
 Artificial Slopes (over 75%)
- RIGHT-OF-WAY**
 High-Arch Overpass
 Canadian National
 Highway
 Highway
- SCALE & PROJECTION**
 20' and 20' and 20' of scale



MAP 8

DETAILED SITE ANALYSIS

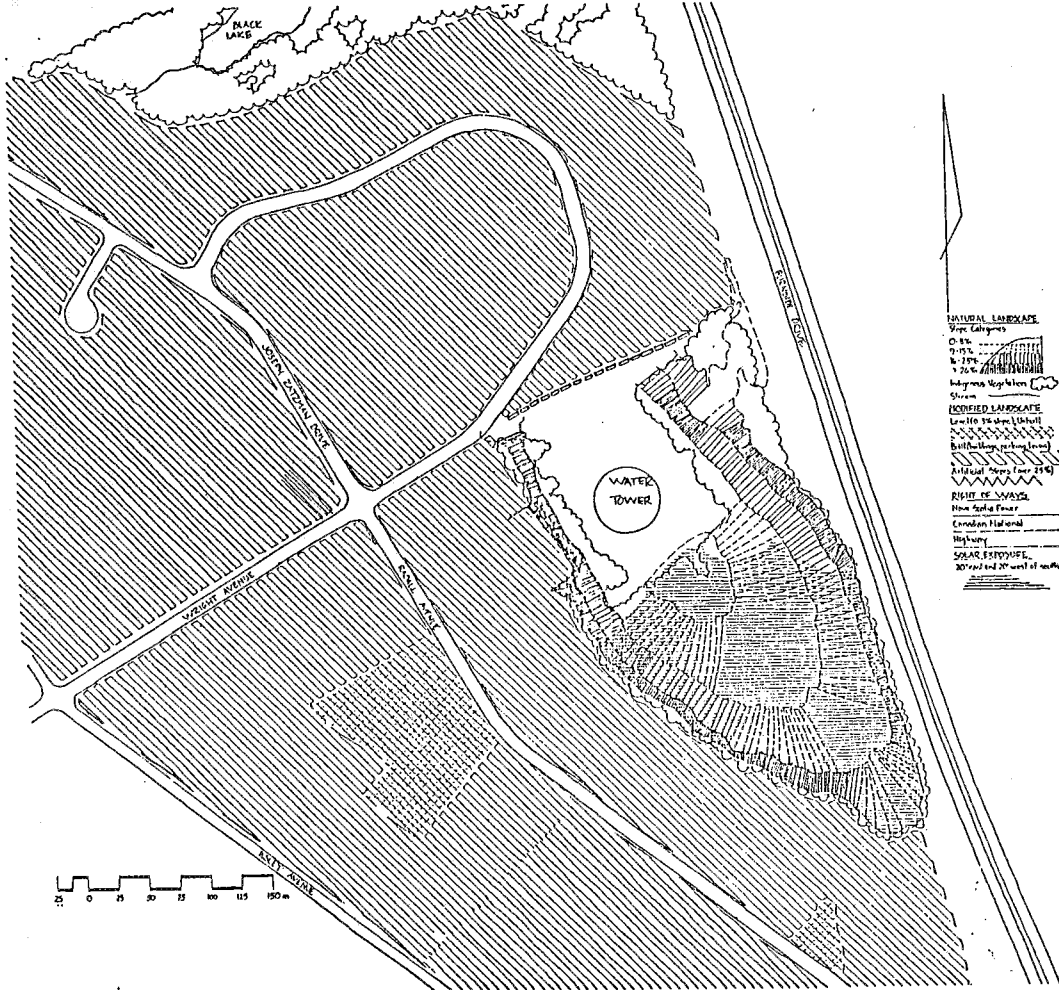
Victoria Road to MacDonald Avenue



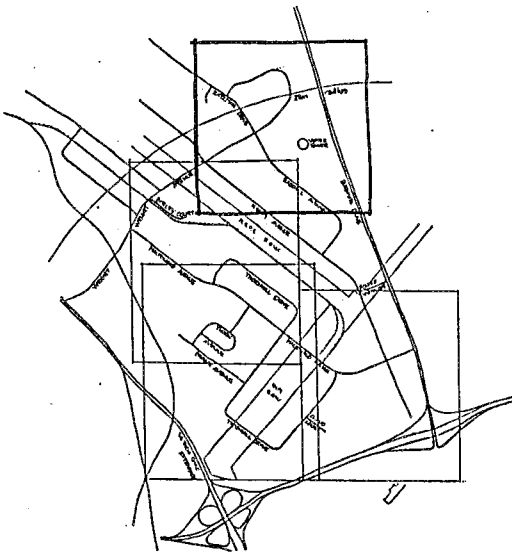
MAP 9

DETAILED SITE ANALYSIS

Ilsey Avenue to Burnside Drive



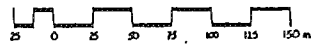
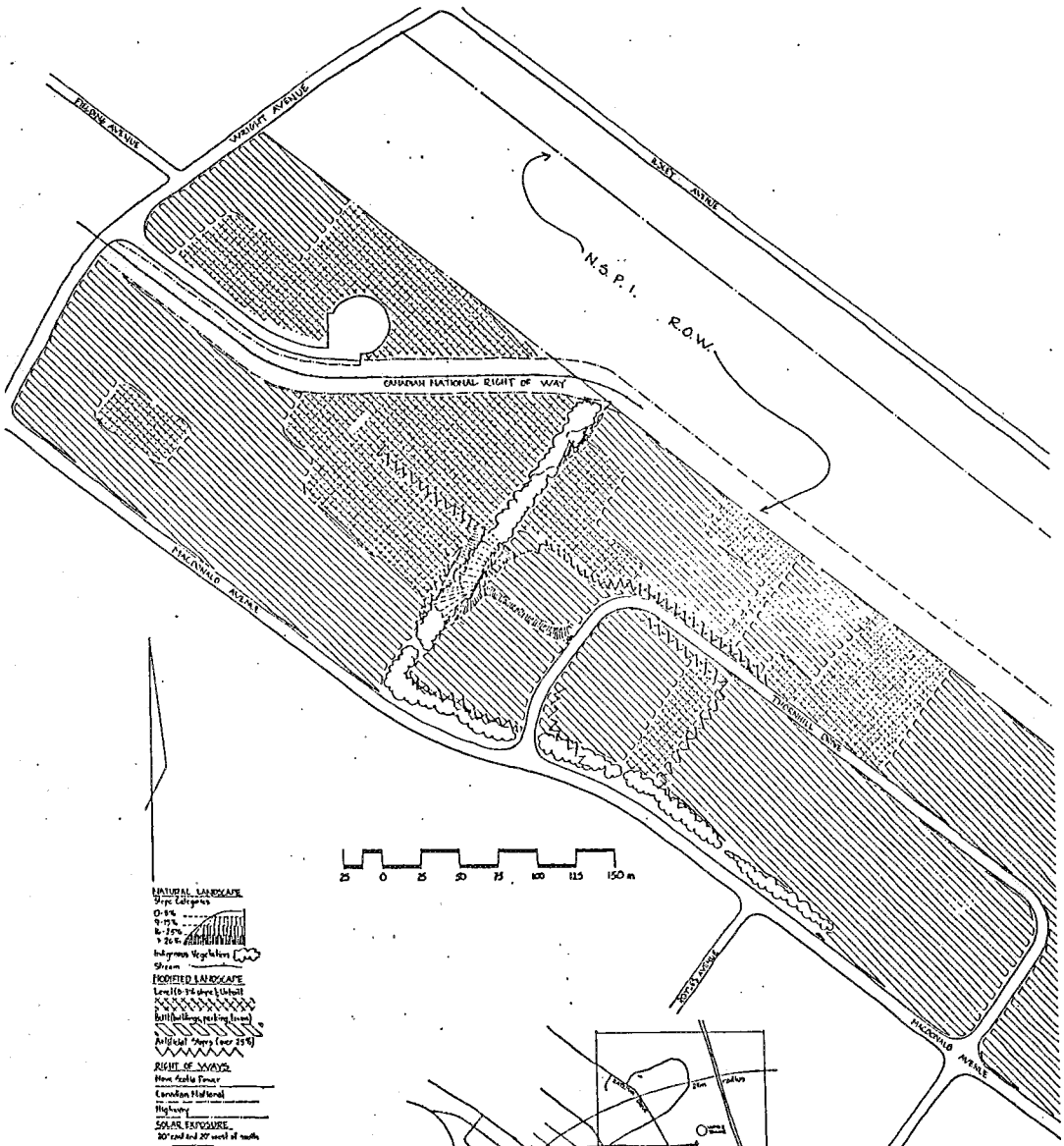
- NATURAL LANDSCAPE**
 Vapour Colours
 0-10%
 11-25%
 26-50%
 51-75%
 76-100%
- WOODED LANDSCAPE**
 Low to Medium Density
 Medium Density
 High Density
- RIGHT OF WAY**
 Non-Grade Road
 Condemned Road
 Highway
- SOUND PROOFING**
 20' and 20' and of north



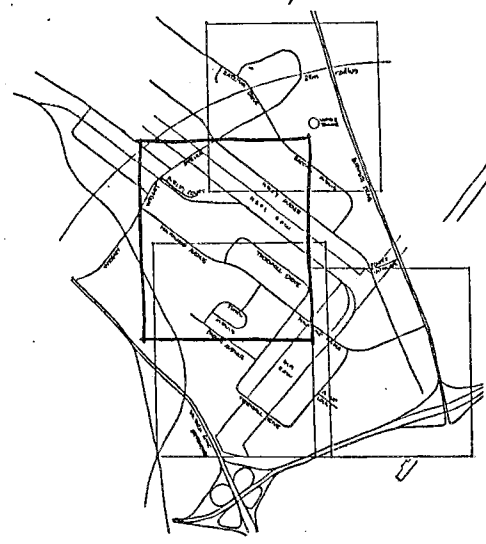
MAP 10

DETAILED SITE ANALYSIS

MacDonald Avenue to Ilsley



- NATURAL LANDSCAPE**
 Steep Slopes
 0-5%
 6-15%
 16-25%
 26%
 Wetlands
 Stream
- DESIGNED LANDSCAPE**
 Low (0-34 slope & 4' tall)
 Ball Fields, parking areas
 Artificial Trees (over 25')
- RIGHT OF WAYS**
 Street Right of Way
 Canton National Right of Way
 Highway
- SUNSHADE**
 30' and less 30' west of north



TEST SITES: CAN HOUSING WORK IN BURNSIDE?

Our analysis revealed relatively few opportunity spaces for housing in the older parts of the industrial park. In many cases, the spaces remaining between buildings are too small or too steep to allow residential uses. Existing low-rise industrial structures cannot accommodate any extra loading on the roof, so that constructing units on top of them proves impossible. Nevertheless, we did identify two opportunity areas within walking distance of the nearest elementary school: we decided to explore them further to assess their suitability for housing. One test site is a small set of lots near the junction of two major routes. The other larger site lies in the older part of the Park where several vacant areas remain.

Test Site 1: Burnside Drive at Highway 111

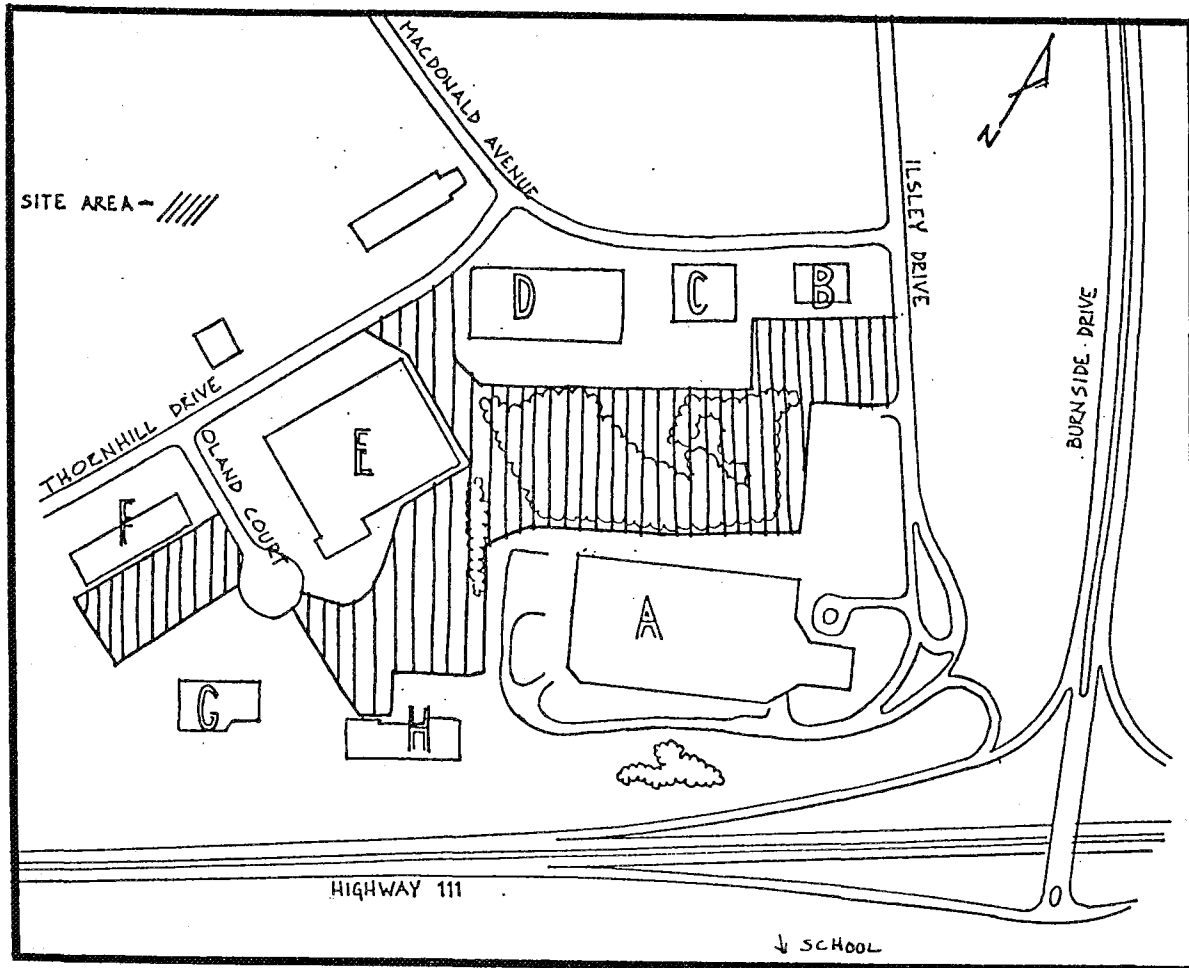
During the fall of 1993, a student member of the study team assessed a 9 acre parcel in the south east portion of Burnside Industrial Park, west of Burnside Drive (Geddes 1993, see figure). The research team had earlier identified the area, Test Site 1, as a small "opportunity space" with some potential for infilling housing (Map 7). Geddes' study sought to determine whether the area seemed suitable for housing, based on the needs and concerns of potential residents.

The test site occupies relatively flat, dry land within one kilometre of an elementary school. No other opportunity space identified is within such close walking distance of the school. Given the Dartmouth District School Board's fiscal situation, we cannot assume that the Board would build new schools in response to residential development. Students living farther than 2 kilometres from elementary schools would have to travel by bus. To avoid the need for more schools and to reduce transportation demand, we decided that we would first investigate the option of infilling housing within walking distance of viable schools.

Geddes reviewed the literature on residents' needs and concerns in neighbourhoods to develop an evaluation framework for assessing the site. He identified four sets of suitability criteria.

Accessible Amenities	Health and Safety
Cost	Aesthetics, Privacy, Control

Figure
Test Site 1, Site Features (Geddes 1993)



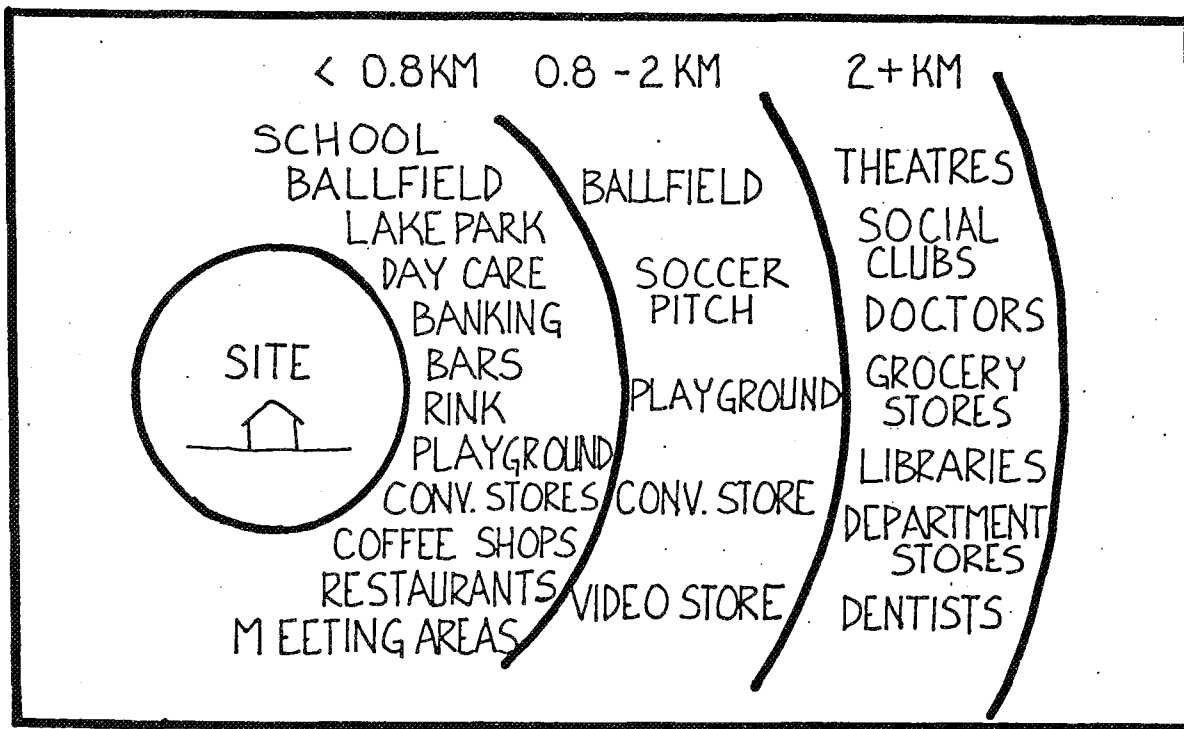
Legend:

- A : Bus garage and transit headquarters
- B : Turf products company
- C : Steel fabrication company
- D : Industrial mall with small businesses

- E : Furniture manufacturer
- F : Vacant
- G : Transfer company
- H : Rental company

Figure

Approximate Distance from Site to Commonly Used Amenities (Geddes 1993)



Residents need amenities and services within a reasonable distance from their homes. If we hope to encourage walking and cycling, then people need sidewalks and bicycle paths to appropriate destinations. Those taking the car need access to and from the site, while those riding the bus need transit routes near their homes. In evaluating amenities and services required in residential areas, Geddes focused on schools, recreational facilities and parks, meeting areas, play spaces, adult activity spaces, local shopping facilities, day care centres, and mass transit routes.

As the crow flies, the test site seems close to the necessary schools and recreational facilities (see figure above). Unfortunately, however, Highway 111 forms an impenetrable barrier to anyone entering or exiting Burnside Park by foot or bicycle. Pedestrians and cyclists cannot use the Burnside Drive overpass. Sidewalks on the east side of Highway 111 end abruptly at the overpass. The test site currently has no sidewalks. Accordingly, persons using wheelchairs or pushing strollers would have no choice but to use road surfaces. The relative flatness of the area would make mobility easy if the city installed sidewalks and crossings.

Because of the proximity of the transit garage, the site enjoys good transit service, with potential for improvement should demand warrant. Burnside's excellent road network offers automobile drivers ready connections throughout the metro area.

Geddes identified several health and safety concerns which limit the suitability of the site for some household types. Children could face risks both from traffic and from industrial conditions. Heavy traffic through the area makes roads unsafe for small children. Without sidewalks and controlled crossings, residents would find the conditions unacceptable. Providing adequate sidewalks to essential destinations would be a precondition of residential development in the area.

We cannot easily remedy the second hazard to children. Many of the businesses around the test site have piles of industrial materials or containers of wastes temporarily stored in their yards. Since we know that children characteristically exhibit curiosity about their environments, we should recognize the risk. Children could endanger themselves or property if they play around industrial areas.

Industrial areas may pose other health risks to residents. On the test site, for example, Geddes found persistent noise and odours. While ambient levels may not exceed environmental standards, residents with health problems may find them unpleasant. Given the nature of industrial activity, noise, dust, and odours occur commonly. The early town planning movement fought to segregate industrial uses for that very reason.

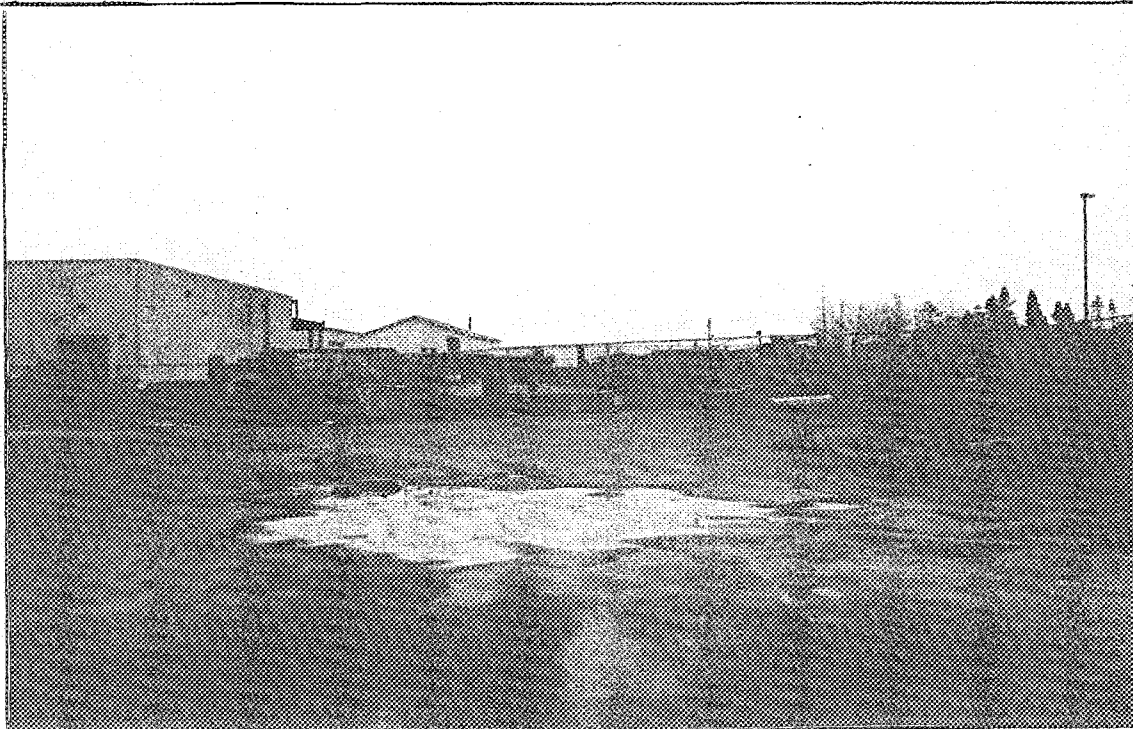
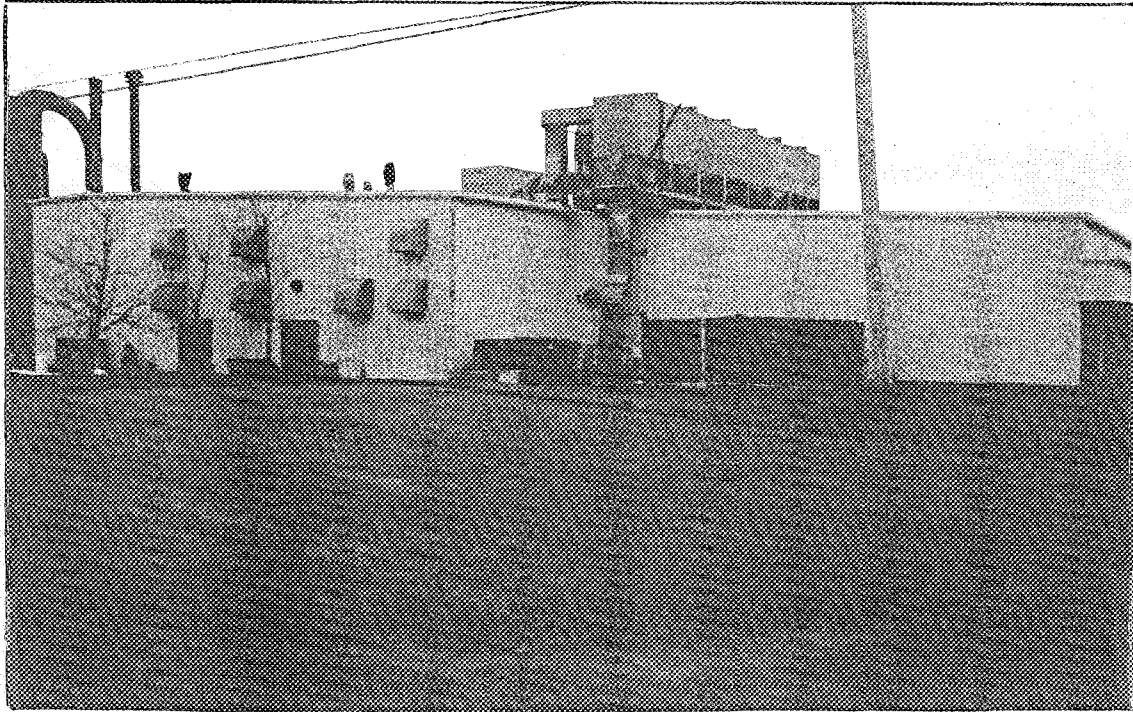
Geddes argued that the cost of land in the industrial park does not preclude affordable residential development. He calculated wholesale land costs at approximately \$15,000 for a small residential lot.¹² Builders could provide multi-family units at reasonable cost. In determining the suitability of residential development in this location, though, we must also consider other factors. Potential residents and investors would evaluate the cost of land in the industrial park in comparison with opportunities elsewhere in the local market. Residential lots within 15 minutes drive of Burnside retail from \$25,000 and higher. The margin of savings available within Burnside may not be sufficient to attract home-buyers. Also, the risk of loss from an industrial accident or of devaluation from unwanted neighbouring uses may scare off investors.

While parts of Burnside retain their natural beauty, many areas have little aesthetic appeal. As Geddes notes, the test site has poor views. Wire fences, piles of industrial materials, and large parking areas provide little visual relief. Residents may feel they cannot control the environment because industrial uses and activities would have to take priority in the area.

¹² This calculation does not include full development costs, but simply divides the retail price of industrial lots by the number of residential units lots could accommodate.

PHOTOGRAPHS

Industrial sites around the Test Site may prove unsightly and noisy for residents.



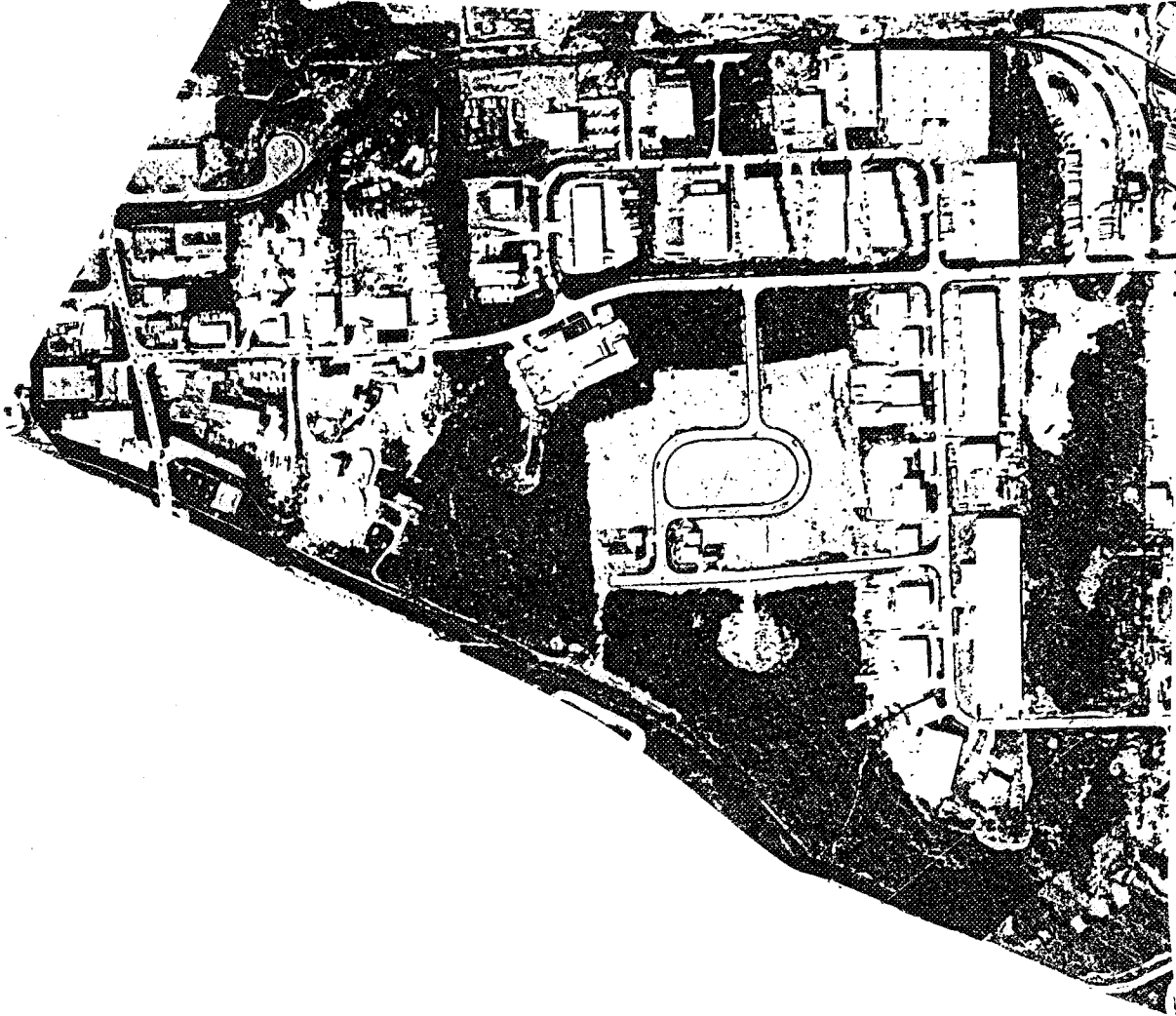
In sum, Geddes (1993) concluded that Test Site 1 would prove suitable for a limited range of households, given existing site conditions.

RESIDENT GROUP	EVALUATION	MAJOR DETERMINING FACTORS
Households with children	UNSUITABLE	Lack of amenities for children Safety risks (traffic, industrial activities)
Adult households	SUITABLE	Close to workplace Buses available Affordable rental units
Senior citizen households	UNSUITABLE	Lack of amenities Noisy outdoor environment No pedestrian routes
Physically challenged	UNSUITABLE	No sidewalks Lack of amenities

Households with children, seniors, or physically challenged members may regret the lack of amenities within easy walking distance. Even if the city installed sidewalks in the area, heavy traffic would continue to make the area dangerous for small children. While a large concentration of residents may entice some services to locate in the area, because of the small size of the test site it seems unlikely that many businesses would see significant opportunities.

Adult households with members working near the site could find the area attractive. Entertainment and recreational facilities appealing to able-bodied adults are available in the Park. Affordable rental housing may entice some workers to move to an area where they can reduce their commuting costs and time.

Figure
Aerial Photo of Test Site 2

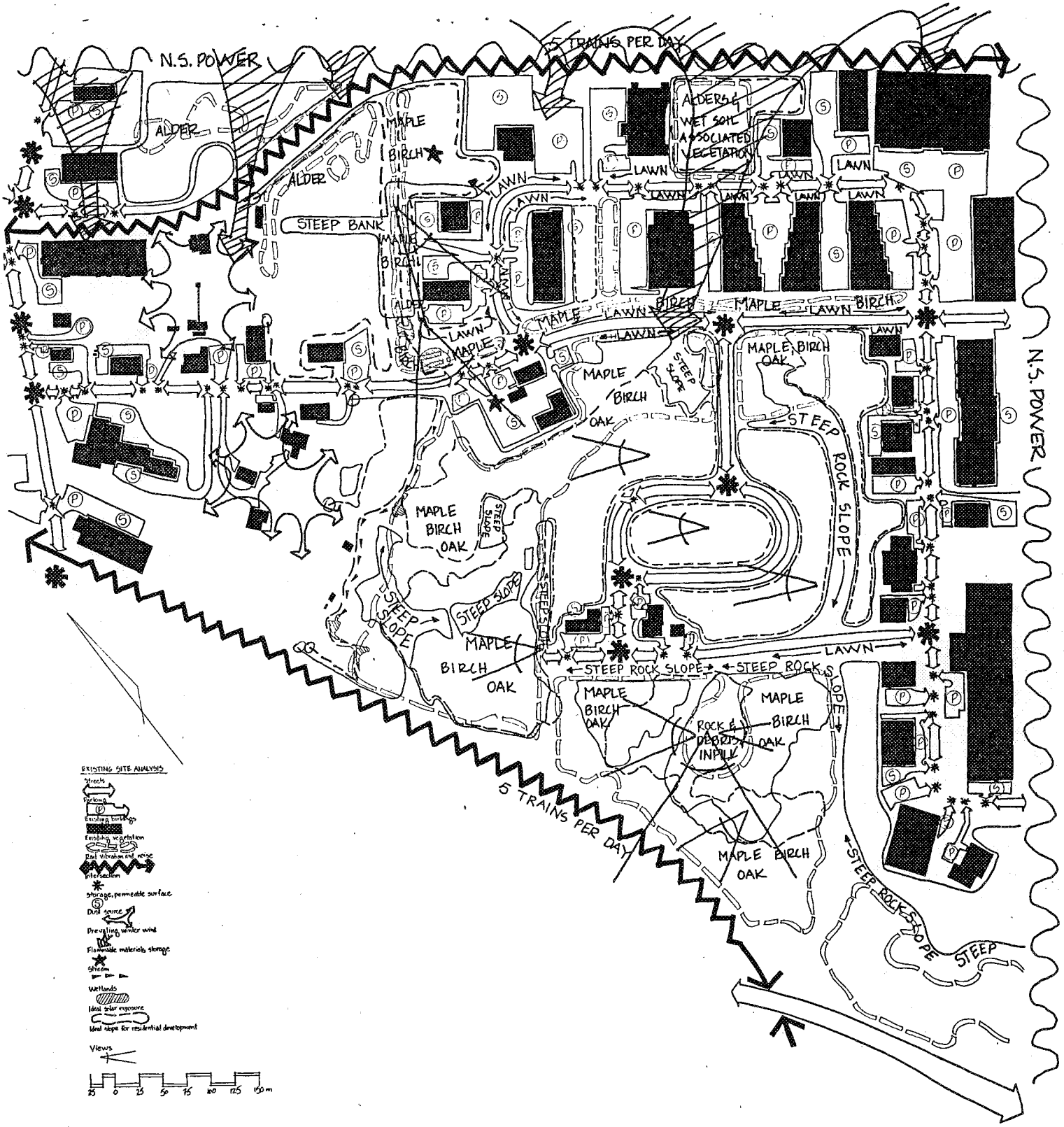


Test Site 2: Victoria Road to MacDonald Avenue

The second test site includes a large portion of cleared and vacant land around Thorne Avenue. The area shows considerable potential for redevelopment with a variety of uses. The area is one of the largest under-utilized pockets in the older part of the Park. Most of the site is relatively flat, except for the wetlands in the bottom corner, and some steep ridges separating properties. As a way of evaluating the potential for housing in Burnside, we decided to prepare designs to integrate housing into the area.

MAP 11

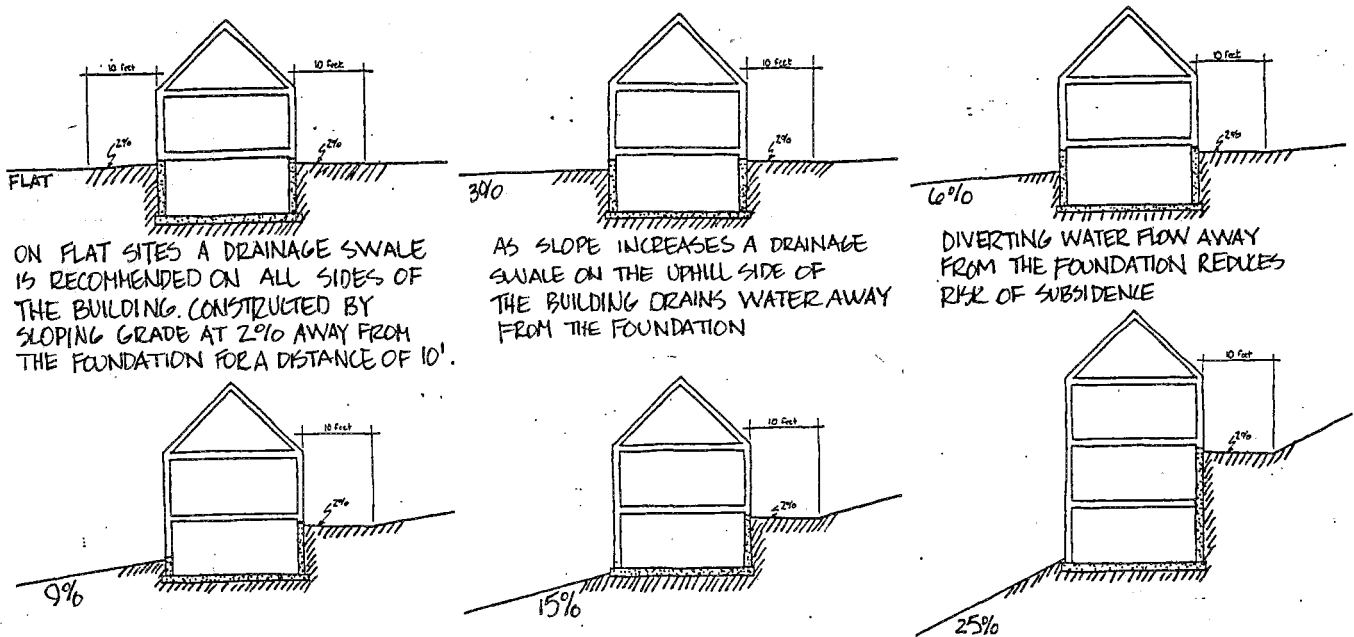
SITE ANALYSIS OF TEST SITE 2



In order to demonstrate the design opportunities for housing presented within Burnside Industrial Park, we subjected Test Site 2 to detailed analysis. The area (see Map 8) lies on either side of MacDonald Ave south east of Wright Ave, between two rail lines. The site includes several blocks; approximately half of the area is unbuilt or undeveloped land (see aerial photo of site).

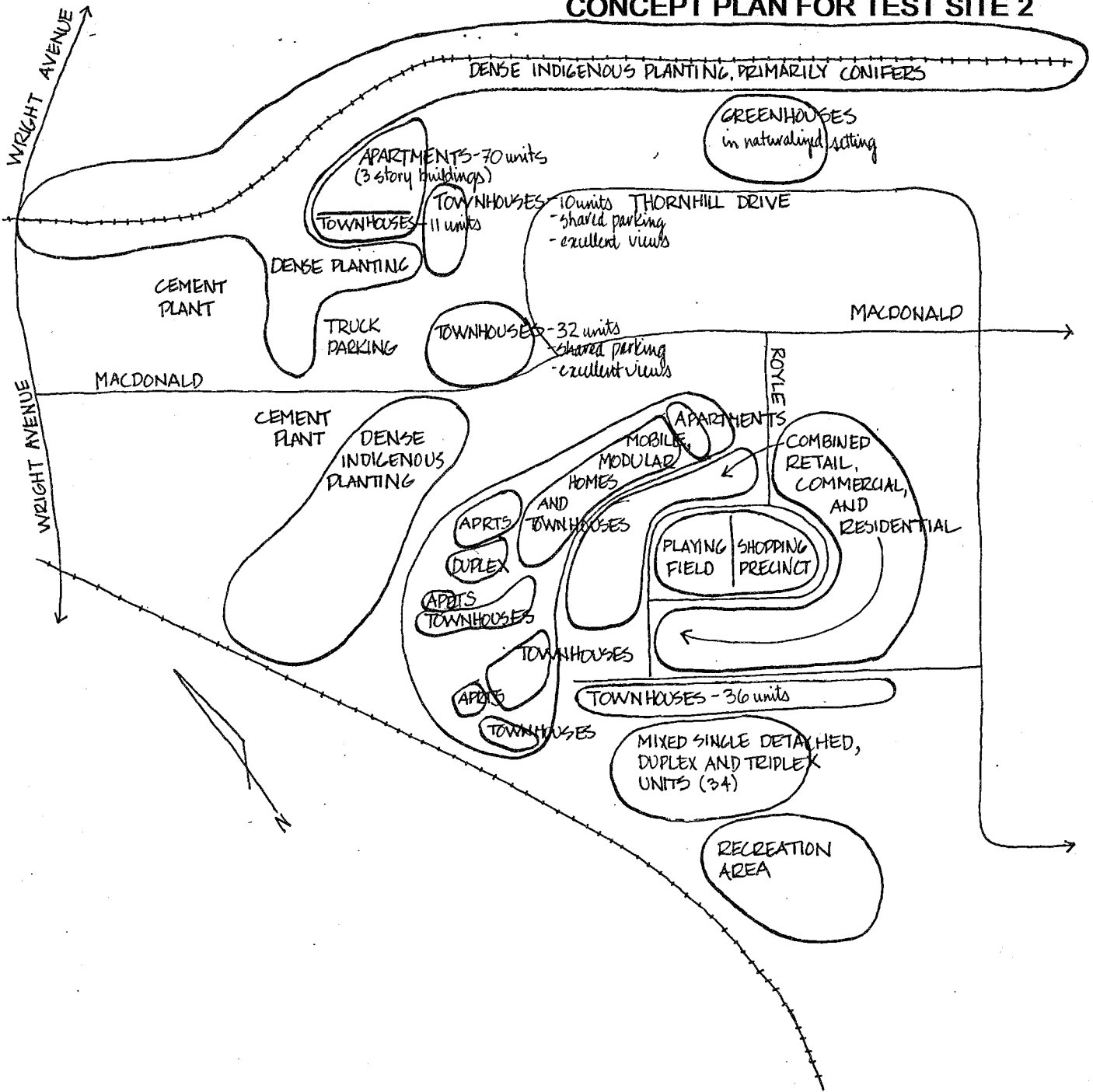
Map 11 shows existing conditions on the site. Portions of the site remain heavily vegetated with maple, birch and oak trees predominating. Steep slopes and banks separate some of the lots, limiting development options in those areas. Most of the site enjoys excellent views of Bedford Basin, good southern exposures, and protection from winter winds. Five trains per day pass along the rail lines on either side of the site. Truck traffic along MacDonald Avenue is moderate, but the size of the available parcel would allow the development of a residential enclave separated from heavy traffic routes.

The concept plan (see Map 12) illustrates an option for the site. All existing industrial uses would remain in place, with housing and other activities co-locating in the area. Heavy plantings of indigenous vegetation would screen industrial uses while limiting winter wind velocity and buffering noise. Pockets of townhouses could nestle into the slopes in an area backing on the rail line (see figure below). Farther along the rail line, greenhouses might take advantage of a vegetated patch between industrial uses. Along MacDonald Avenue, a large lawn could make room for two rows of townhouses screened from traffic by heavy plantings.



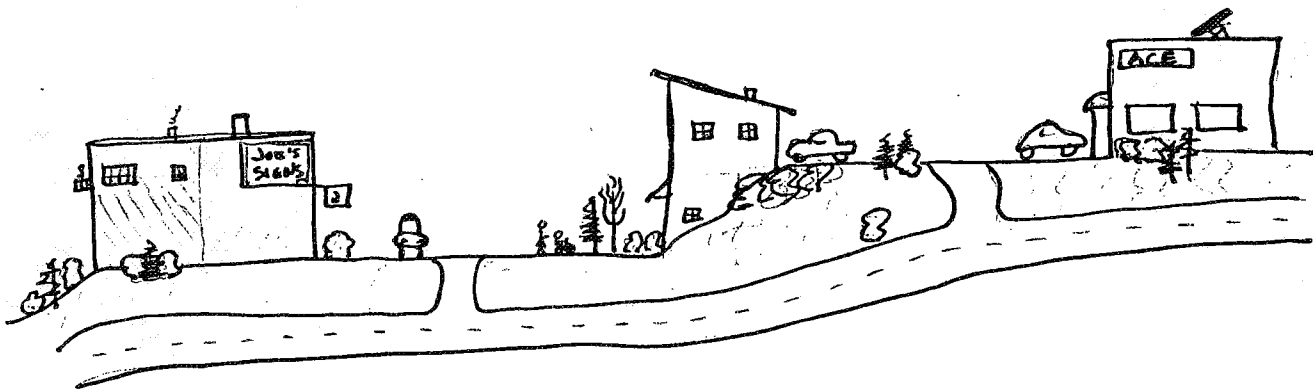
The illustrations show dimensional criteria for residential developments on sloped lands, like those found in Burnside.

CONCEPT PLAN FOR TEST SITE 2

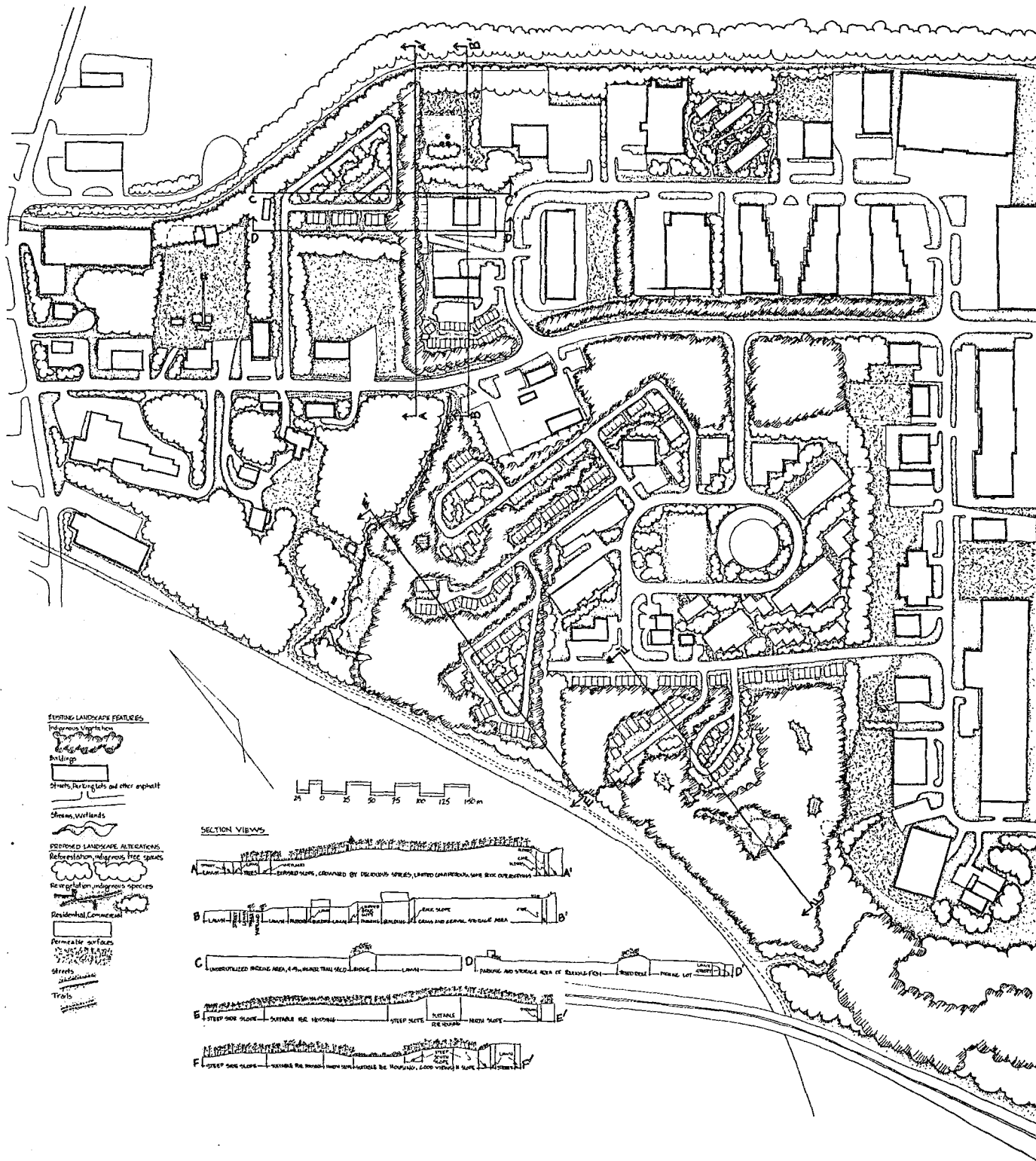


To the southwest of MacDonald Avenue, a large site could conceivably accommodate a substantial residential pocket of up to 400 dwelling units. The main loop into the site, Thorne Avenue, would serve a mixed use commercial and residential area, with a ball field as the central green. Commercial buildings would face the loop, some with residential units above the stores. On streets off the loop, townhouses and apartments would enjoy excellent views and good southern exposures. Off small streets to the southwest, single detached houses would abut a small recreational area and pond.

The site plan (Map 13) illustrates the concept in some detail. It demonstrates that with good design it is feasible to integrate residential uses into an industrial landscape with attractive results.



ILLUSTRATIVE SITE PLAN FOR TEST SITE 2



INTERVIEW FINDINGS

During the summer and fall of 1993 we interviewed a series of people about the suitability of Burnside Industrial Park for housing. Respondents included city staff, industrial commission members, city council members, realtors, workers, and business managers in Burnside. We interviewed approximately half of the respondents in person, and half by telephone. One respondent returned answers to the questions by fax.

Summary of Respondents' Views of the Benefits and Drawbacks of Adding Residential Uses to the Mix in the Industrial Park

BENEFITS	DRAWBACKS
<p>Infrastructure Adding housing to the mix could make more efficient use of water, sewer, power, transit, parks, trails, or roads.</p>	<p>It could increase demand for police, fire, sidewalks, schools, playgrounds, entertainment, or retail facilities.</p>
<p>Mix of Uses Adding housing could create new business opportunities. It could keep the industrial park occupied in the evening.</p>	<p>Respondents acknowledged the potential for conflicts over noise, odor, traffic, risks, or hours of business. Some also saw potential for theft or vandalism from residents. Mixing uses could undermine stability of investment in the area. Adding "lower level" uses could affect the urban tax base.</p>
<p>Quality of Life Some respondents thought that adding housing could create an attractive mix in beautiful surroundings. Workers who live in the industrial park may find themselves with more leisure time. Living near work encourages walking.</p>	<p>Respondents feared the potential for ghettoization, slum development, low quality housing, and isolation for people living in industrial areas. Some discussed possible health risks or safety problems from heavy traffic. Industrial architecture is often cheap and ugly.</p>

<p>Local Context</p> <p>Having people live near work could reduce energy demands.</p> <p>Some respondents thought adding housing could create a node for development and self-contained growth.</p>	<p>Respondents feared the effect of putting housing in industrial areas on the rest of urban fabric. Some spoke of current problems with decentralization and downtown degeneration.</p> <p>Several respondents mentioned the availability of sufficient attractive, affordable housing within commuting distance.</p> <p>Some suggested that adding housing would imply a change in public investment policy.</p>
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Although some respondents offered unqualified support or total opposition to the idea of providing housing in industrial parks, most of the people we consulted saw both benefits and drawbacks to the idea. The most significant effects fell into four categories: infrastructure, mix of uses, quality of life, and local context. In the discussion which follows, we reproduce quotations from respondents in italics.

Infrastructure

Many respondents suggested that housing residents in the industrial park would provide more efficient use of infrastructure such as water, sewers, power, public transit, roads, and trails. Some worried whether existing parks and playgrounds would meet the needs of a large residential community, but staff thought that park facilities could tolerate additional use.

I think it's feasible to put housing in the industrial park. I'm not sure if the existing infrastructure out there could handle it. In the newer portions, if they were developed properly, that would be the way to go. ...If you have buildings in the older part that aren't being used, then it might be feasible to convert them to residential. You'd need to do a lot of research to see.

Some buildings have been converted from warehousing to tennis courts and indoor soccer pitches, and one of our playgrounds is on an old landfill site. So you can convert to other uses. There are problems, but it can be done.

Most respondents pointed to new demands that residents would place upon services such as police, fire, and schools. Residential areas have different policing and fire needs than do industrial areas. Police surveillance will have to increase, and certain types of crimes will likely increase. Because children cannot walk to school from the area, bussing may be necessary. Several respondents forecast demands from residents for a local school. More sidewalks and cycling facilities would be necessary to avoid reliance on automobiles.

Mix of Uses

Most of those interviewed advocate a diversity of uses for the industrial park.

We already have a wide range of uses in the park. The only thing there isn't much of is heavy industry. And there's no housing - but I sometimes wonder if Highfield Park¹³ isn't really a part of Burnside with housing. If you were thinking of adding housing to the mix you'd have to think about what kind of housing.

In a way, "industrial park" is a misnomer for what we have in Burnside. It's about 20% industrial uses, then a mix of commercial, retail, warehouse, office. I would like to see more high tech development, and more office uses. Those have good tax base potential for the city.

Many respondents believed that having residents in the industrial park would increase business opportunities for retailers. Residents would need grocery stores, for example. Entertainment providers would welcome people in the park during the evening hours.

It's vital to have diverse uses out there if it's to stay viable. Otherwise it will just be an industrial ghetto and there won't be a good quality of life there. Generally it's been moving in a good direction, except for the incinerator.

Creating new mixes of uses also has the potential to generate conflicts, according to many respondents. Residents don't like noise, odours, unsightly piles, and traffic. They may complain if businesses operate during the night. Park managers and property lessors say they already experience problems with NIMBYism: some businesses do not welcome other businesses, even in the back yards of industrial parks. Many residents expressed concern about the future of the Park if the Metropolitan Authority builds the regional incinerator¹⁴ northeast of Burnside Drive as proposed. Secure investments depend upon some stability.

¹³ Highfield Park is a large complex of walk-up apartment buildings across Highway 111. The complex added so many rental units to the stock in Metro that vacancy rates in Dartmouth currently exceed 6%. Unfortunately, the complex has rapidly acquired a negative reputation in the city because of high crime rates and poor construction quality.

¹⁴ The Metropolitan Authority, responsible for waste management in the Halifax Metropolitan Area, has proposed to build an incinerator to burn approximately 40% of the region's wastes. Environmental impact assessment hearings finished in early 1994.

Figure

Newspaper coverage indicates typical concerns in Burnside
(Daily News April 1993, Mail-Star July 1993)

THE DAILY NEWS, THURSDAY, APRIL 8, 1993

Dump should go in Burnside park, two aldermen say

Landfill would solve money woes

By PETER McLAUGHLIN
The Daily News

Two aldermen have a solution to Dartmouth's money woes: a dump.

Ward 3 Aldermen Phil Levandier and Colin May will ask council next week to instruct economic development director Tom Rath to see whether metro's new landfill can go in Burnside Industrial Park.

It's already the site of metro's future garbage incinerator.

May said yesterday it makes economic sense the landfill be as close as possible to the main garbage-producing area, instead of far-flung East Lake -- the site chosen last year and now under reconsideration.

"The start-up costs would be lot less and the annual operating costs will be dramatically lower," he said. "It's a good, practical answer to metro's garbage problem."

The landfill could mean millions of dollars for the city, racked by recession, soaring welfare costs and diminished tax revenue.

The Metropolitan Authority has promised to pay the host municipality \$2 million, plus about \$1.2 million a year.

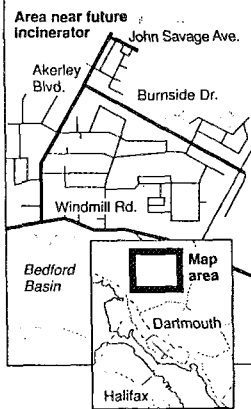
Dartmouth has already agreed to host the authority's waste-to-energy incinerator, which will bring in \$10 for every tonne of garbage delivered to the site.

The aldermen believe there is sufficient city-owned land in the north end of Burnside, near the incinerator site, that may be suitable for the dump.

The old Commodore lands are part of an area metro politicians examined 16 years ago for the current landfill. It was taken off the list when Dartmouth earmarked it for industrial development, and the

Suggested landfill site

Two Dartmouth aldermen say the north end of Burnside Industrial Park might make a suitable location for a landfill.



landfill ended up in Upper Sackville.

Jeff Morris, chairman of the Dartmouth Chamber of Commerce's Burnside Committee chairman, said he's withholding judgment on the proposal.

"I'm sure there are pros and cons, but obviously we want to be very sure the stigma attached to a landfill will not affect business and property values in the park."

Ward 5 Ald. John Woods, who represents Burnside, said he would oppose a landfill in the park. He said he doesn't trust promises the landfill will be free of rodents and harmful leachate.

Civilian patrols suggested for Burnside

By Bruce Erskine
STAFF REPORTER

Volunteer civilian patrols might be one way to check crime in Burnside Industrial Park, says Dartmouth police chief Don MacRae.

Chief MacRae told a meeting of the Burnside Industrial Park Committee Wednesday that similar patrols, which look out for crime rather than try to enforce the law, have worked in Edmonton.

The Edmonton patrols do a variety of police-related work, including surveillance, he said.

Chief MacRae made the suggestion after Dartmouth mayor Gloria McCluskey announced the July 1 launching of the Burnside Business Watch program, a neighborhood watch for businesses that will be co-ordinated by a yet-to-be-named Dartmouth police officer.

Recent city budget constraints have reduced police manpower, and Mayor McCluskey said park businesses have to do their part by looking out for possible criminal activity and reporting it to police.

What makes Burnside popular with criminals is that it contains everything a thief might want, Chief MacRae said.

Police hope that the business watch program, which has been funded by the city for a six-month period, will make park tenants more aware of security shortcomings and help create a united front against crime.

As a planner argued, businesses would perceive adding housing as a major change.

Some commercial interests would ask: "why is the city undermining our investment?" Changing the uses could affect the atmosphere. They would wonder if the city is withdrawing its support after all these years. ... Business wants certainty above all. In meetings people aren't thrilled when apartments go up down the street. The same could happen here. Businesses want to do what they want when they want to. They don't want people complaining. Burnside has always given businesses that surety. The purpose of the area is clearly known so there's a security of investment. It could be a disbenefit to remove that.

Some respondents argued that bringing residents into the industrial park would increase problems with vandalism and theft. Currently, parks and trails in the industrial park show fewer signs of vandalism than do parks in residential areas. Burnside has significant crime problems with break-ins and robberies though; some of those interviewed linked a perceived increase in crime to new apartments in Highfield Park. The poor reputation associated with Highfield Park may well rub off onto potential new developments within Burnside.

You'd have to carefully balance the requirements of housing and industry to be sure to meet the needs of both. If it got unbalanced, you could have problems. That would require long term planning and considerable flexibility. You don't want to block yourself in so you can't move 15 years from now.

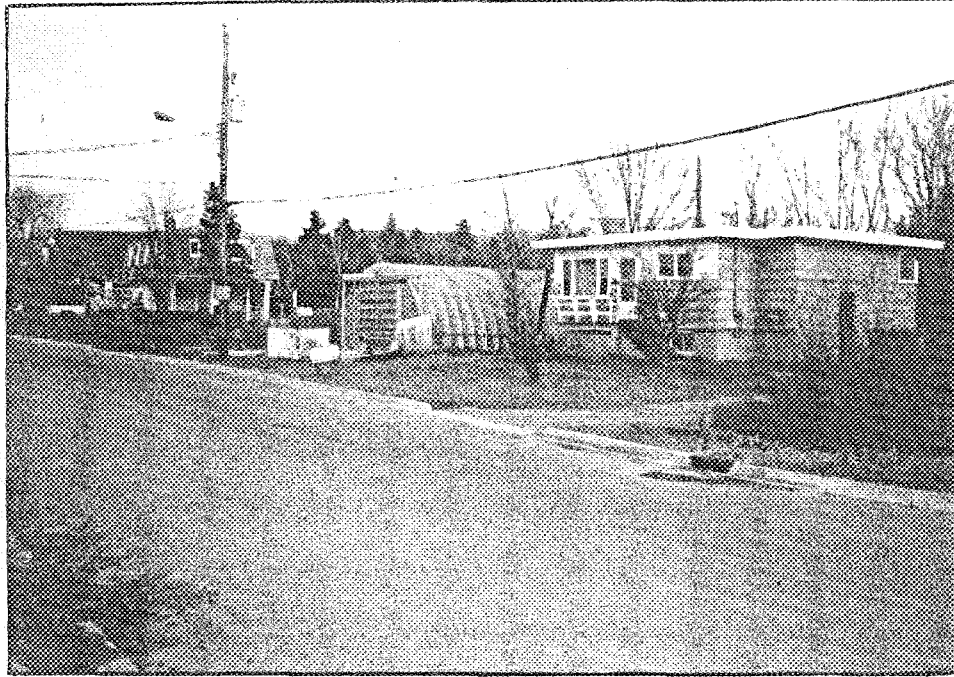
The city could experience a shift in balance because growth could go there. You'd have to look at it from a city perspective. Could you really put schools out there?

Worries about the effects of housing on the tax base led some to oppose adding residential uses to the industrial park. As some said, housing doesn't pay for itself. The city cannot afford to transform revenue generating industrial land into revenue consuming housing. Industrial land is highly valued because of its potential for long term revenue generation.

The bottom line is that residential does not carry itself. We need the commercial tax base to subsidize residential growth. After all, you don't have to provide schools for commercial uses.

PHOTOGRAPHS

Until the mid-1980s, several homes remained in the older part of Burnside, on Dawn Drive off Windmill Road. Only a few of the buildings survive in 1994, most with commercial uses.



In some of the small courts in the interior of the industrial park, small commercial enterprises operate out of buildings that seem residential in character. Residential structures would appear well-suited to such locations, provided other requirements can be met.



Quality of Life

Several respondents felt that high quality residential environments could work in the attractive environment east of Burnside Drive. Extending the office portion of the industrial park to include high end housing seemed desirable to many people.

It would be good to create attractive residential environments around Spectacle and Frenchman's Lakes. You know, too many of the entrepreneurs and businessmen in the Park don't live in Dartmouth. They're out in Eaglewood in Bedford. If we built good executive type housing, in the \$200,000 range, we could encourage some of them to live here in our community.

Some respondents suggested that if workers live near their employment they will have more time and money for leisure activities. They saw a pedestrian-oriented lifestyle as desirable. Some thought the industrial park more suitable for singles than for families because of the types of amenities available.

Many respondents, however, saw significant risks associated with quality of life in an industrial park. They worried about creating ghettos and slums for low income people. They feared isolating people in an area with limited services and potential environmental hazards. Several asked: "how will you create a community there?"

I don't know how we're going to get over the separation of uses out there. We've trained people for years to separate, now we come in with new ideas. Are we being "status quo"? It might be that you could do it somewhere, but I can't see it here. Will it work to turn industrial buildings into craft centres? I keep hearing "company town", even though you aren't saying it. But who would develop this housing if not the big boss? Yuk. I tried to get over this fiefdom aspect, but I can't. ...

The climate of Nova Scotia makes a pedestrian orientation less desirable than it has proven in southern regions. Some respondents found it difficult to believe that people would stop driving even if they lived close to work and shops.

You have to remember, this isn't Florida. Ideas that can work well in areas where you can walk outside for 12 months, won't do so well here. Burnside was designed for the car, not for walkers. There aren't many things that would benefit residents.

Those concerned about the incinerator proposed for Burnside cited that as a definite drawback to creating residential environments. Park managers indicated that talk of an incinerator even hampered plans to market industrial sites. Worries about air quality and pollution could affect perceptions of the environment in the area. Surprisingly, some respondents argued that

bringing residents into the industrial park could improve environmental monitoring because residents won't let industry get away with bad practices.

Local Context

Several respondents agreed that providing housing closer to work could reduce some of the traffic and energy consumption associated with commuting to work. They suggested that in larger communities those savings make mixing housing with industry attractive. In the local context, however, they said that most people can get to work at Burnside in 15 to 20 minutes from anywhere in Metro.

Some respondents saw housing in the industrial park as a positive way of creating a new node for urban growth and development. Other respondents feared the same prospect. Several of the people we interviewed pointed to the relationship between the success of Burnside and the death of downtown Dartmouth. Creating a successful industrial and commercial node on the edge of a city can undermine the viability of the city centre.

What was really lacking in the planning of Burnside was thought about what it would do to the rest of the city. The city wanted to move old unsightly industries out to Burnside, but they didn't think about afterwards: what would happen to the downtown? As a result, the downtown has a lot of derelict buildings and vacant property.

If you got a big enough critical mass of housing in Burnside then you might see a change in the dynamic of the city over time. Already Burnside has more office and retail than downtown. If it had housing too, then you would have created a city. It could secede from Dartmouth and take away the tax base! No one goes downtown to shop anymore; Burnside has contributed to that. It has sucked the life out of other parts of the city.

Canadian cities consciously embarked on public investment programs to provide serviced industrial land. They created industrial parks for particular public purposes. They cannot readily abandon the original purpose without consequences. If they begin selling off land for housing, then they will compete with private entrepreneurs.

It's a public policy issue. Burnside is owned by the city. Tax dollars built that place. It has a public purpose to it. What would be the purpose in a public agency to come in like a paternalistic presence and say "build housing"? Why would we want to do that when there's no demonstrated need? The older industrial parks tended to be private, but these new ones are instruments of public policy.

As many respondents noted, we must consider the desirability of housing in industrial areas in context of local priorities and the housing market in an area. Given the widespread availability of affordable and attractive residential environments, who would choose to live in an industrial park? Low cost rental housing is available in Highfield Park, across Hwy 111; many respondents pointed to it as a woeful example of the worst low-quality housing. High end housing abounds with 10 to 15 minutes of Burnside; people can afford elegant homes with water frontage for the price of a one-bedroom condominium in a large urban centre. In crowded areas like California or New York people may make the trade-off to live in industrial areas because they have no choice; in Dartmouth people can afford to choose somewhere nicer than next door to a factory.

Summary

Most respondents thought that housing could form part of the mix of uses in an industrial park, although they saw several difficulties with the idea. Most did not think that retrofitting the older parts of Burnside seemed feasible, although they might advocate housing in new industrial/office park areas.

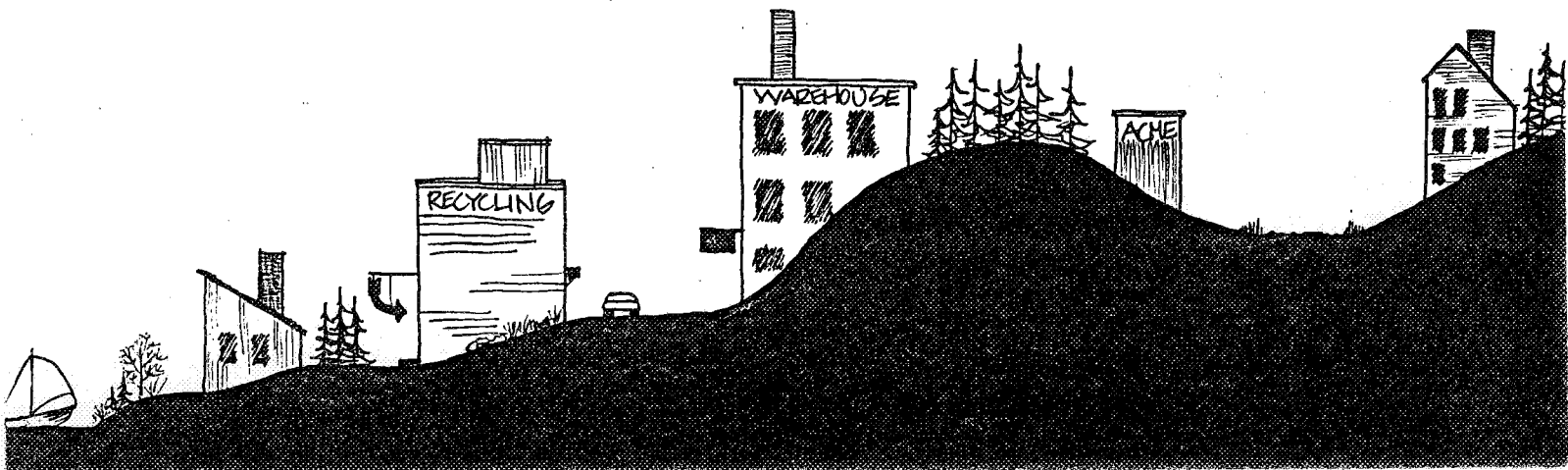
Several of the people we talked to reflected on the paradigm shift which our research question entails. For bureaucrats used to dealing with segregated uses, a regime that congregates different land uses represents new territories and problems.

You have to recognize that there's an institutional culture at work here: "this is how we do things, this is how we've always done it; why change?" Civil servants can be pretty intransigent and stubborn and opinionated.

Nonetheless, civil servants, politicians, and others involved in industrial land uses realize the difficulties that communities and industrial parks face in the 1990s. They are interested in discussing and assessing new ideas as they consider strategies for the future.

SECTION 3: DISCUSSION

Approaches to Congregating Land Uses



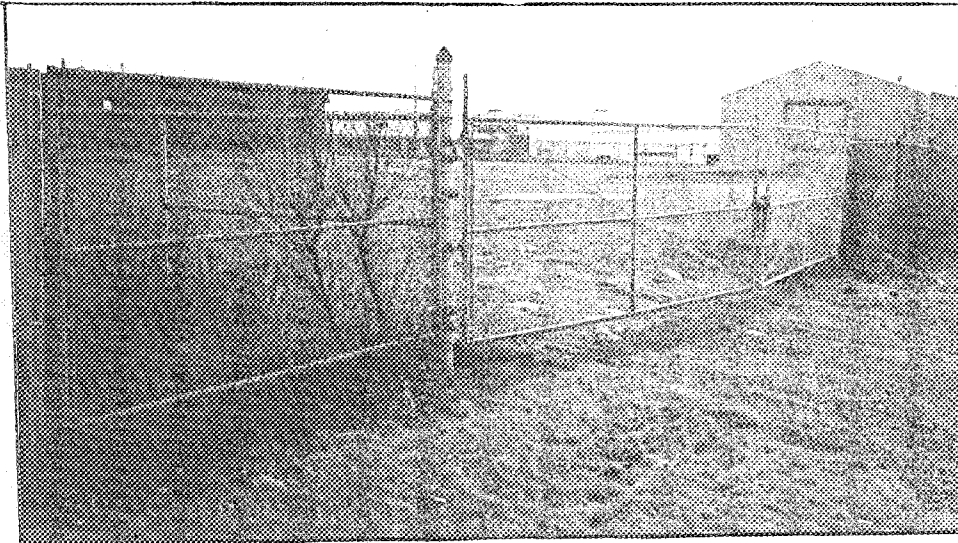
INDUSTRIAL FUTURES...

To understand the problems industrial parks face in the late 20th century, we need to look beyond the particulars of any given park. Across Canada, many industrial parks are coping with de-industrialization and down-sizing. Plants close. Municipal tax revenues decline. Billions of dollars invested in industrial infrastructure are in jeopardy.

In low-growth regions, companies can pick the industrial park that offers them the "best deal"¹⁵. Competition between communities for industrial employers has grown fierce in recent years. Desperation does not make for top standards. Furthermore, the true costs of development, including the social and environmental costs, are generally not passed on to site users: if they were, Cervero (1991) argues, people may behave differently.

Communities across the country seek solutions to these problems. They all want good development for future generations. Perhaps we should develop new options for vacant industrial land. By making different choices we can endeavour to move towards greater sustainability in our communities. Is housing a suitable option for new development in industrial areas? In the last sections of the report, we attempt to answer that question.

Large vacant yards and mandatory wire fencing create hostile landscapes.



¹⁵ For example, industrial land in Burnside Industrial Park sells for \$125,000 an acre. That price represents a fair return on the City's investment in preparing the land for sale. By contrast, the operators of other industrial parks in the region offer land below costs, often starting as low as \$65,000 an acre.

Conclusions From the Case Study

Business parks typically show low employment density, one dominant land use, unlimited free parking, large lots (40% more land than building), and a pedestrian-hostile environment (Cervero 1991). Burnside certainly follows this pattern: most of the park has no sidewalks, and large distances separate buildings. Our analysis revealed a completely modified landscape, with relatively few patches of indigenous vegetation remaining. Large amounts of vacant land provide abundant opportunities for alternative uses or for comprehensive redevelopment.

The site analysis showed that several parcels of land in Burnside offer sufficient space for residential development. Test Site 2, for example, is large enough to house several hundred households. With only slight modifications to the original site planning and construction standards, the Park might have presented many more opportunities for appropriate infill. Analysis revealed, however, a number of constraints to infilling with residential development. Fears about traffic safety and access to the school make most areas unsuitable for small children until the city installs sidewalks and a pedestrian overpass. Households with adult members who work in the Park could find the area suitable for affordable housing; other types of households would likely not move to the area.

Respondents interviewed for the study had diverse opinions about the suitability of housing in Burnside. Those who advocated putting housing there supported the idea of building in the City of Lakes Business Park, not in the older light industrial area. Mixing housing with office and research park development has grown in popularity across North America. Certainly the natural environment proves attractive in City of Lakes. However, with the likelihood of a metropolitan incinerator nearby, it seems probable that few people would choose to live in the area.

In sum, the analysis of Burnside shows that many factors affect the viability of mixing housing with industrial uses.

Industrial activities

People find quiet, clean industries potentially good neighbours. Because of the mix of activities in Burnside, housing would not prove suitable in many areas. Mixing uses can only work if the activities do not interfere with each other.

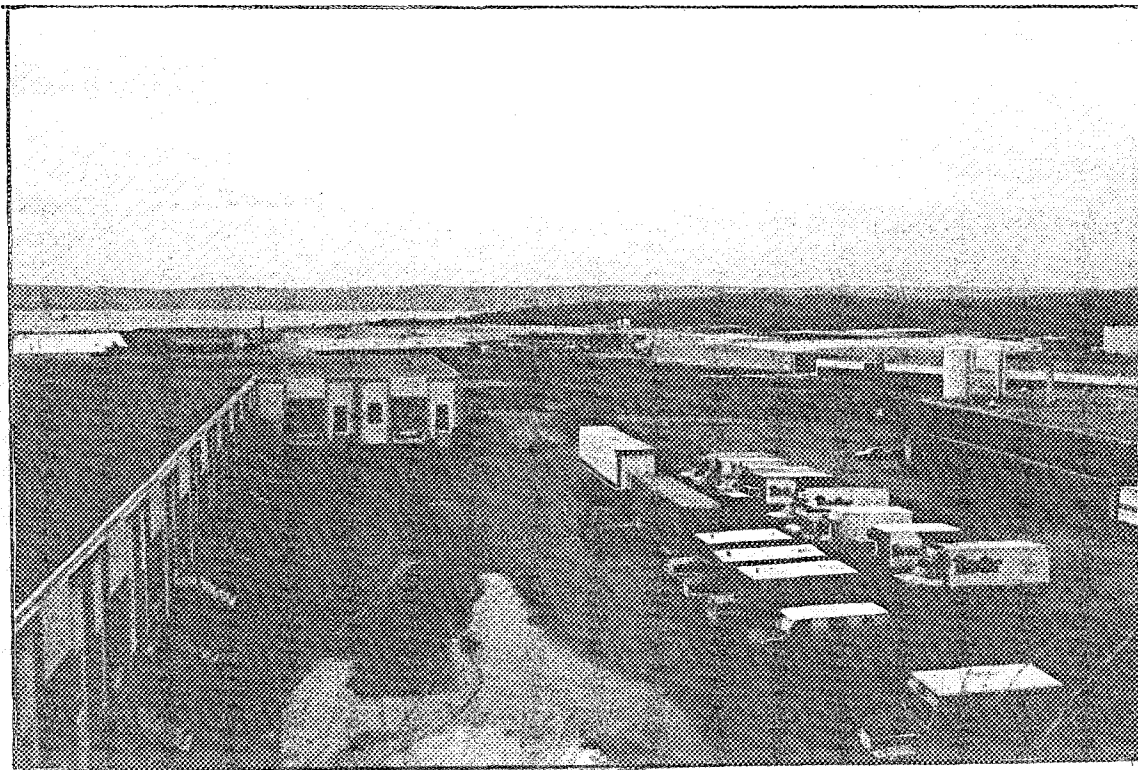
Active industrial areas present inherent risks of accidents. Production processes require chemicals and equipment that generate risks. While workers accept such risks as necessary for employment, people generally do not welcome dangers near their homes. Residents near dangerous businesses would have cause to worry about their health and safety. Businesses have reason to fear that residents near their plants would resist and resent industrial activity and

risks.

Physical setting

People generally seek attractive physical settings for housing. Parts of Burnside have good amenities: lakes, wetlands, harbour views. Unfortunately, many vacant parcels look over unattractive storage yards or chain link fences.

The most suitable areas for housing include those located near key amenities, such as playgrounds, schools, transit routes, or parks. An attractive area, near water courses or with scenic views will increase the desirability of housing. Ideally, the site can be semi-isolated from neighbouring industrial units to limit noise, odours, traffic, and visual clutter. For example, the site plan for Fair Lakes Office Park in Virginia shows residential clusters separated by bands of landscaping (see figure, page 88). The site designer for Fair Lakes indicated during a telephone conversation with one of the authors in late 1993, that the principals wished they had included housing in a more integrated fashion with other uses, instead of in separate pods. Our respondents in Dartmouth, however, generally seemed to favour keeping residential uses somewhat separated from possible industrial activities.



While Burnside enjoys fine distant views of Bedford Basin, foreground views show a physical setting dominated by vehicles.

FIGURE
SITE PLAN FOR FAIR LAKES
A Business Park in Fairfax, Virginia

FAIR LAKES

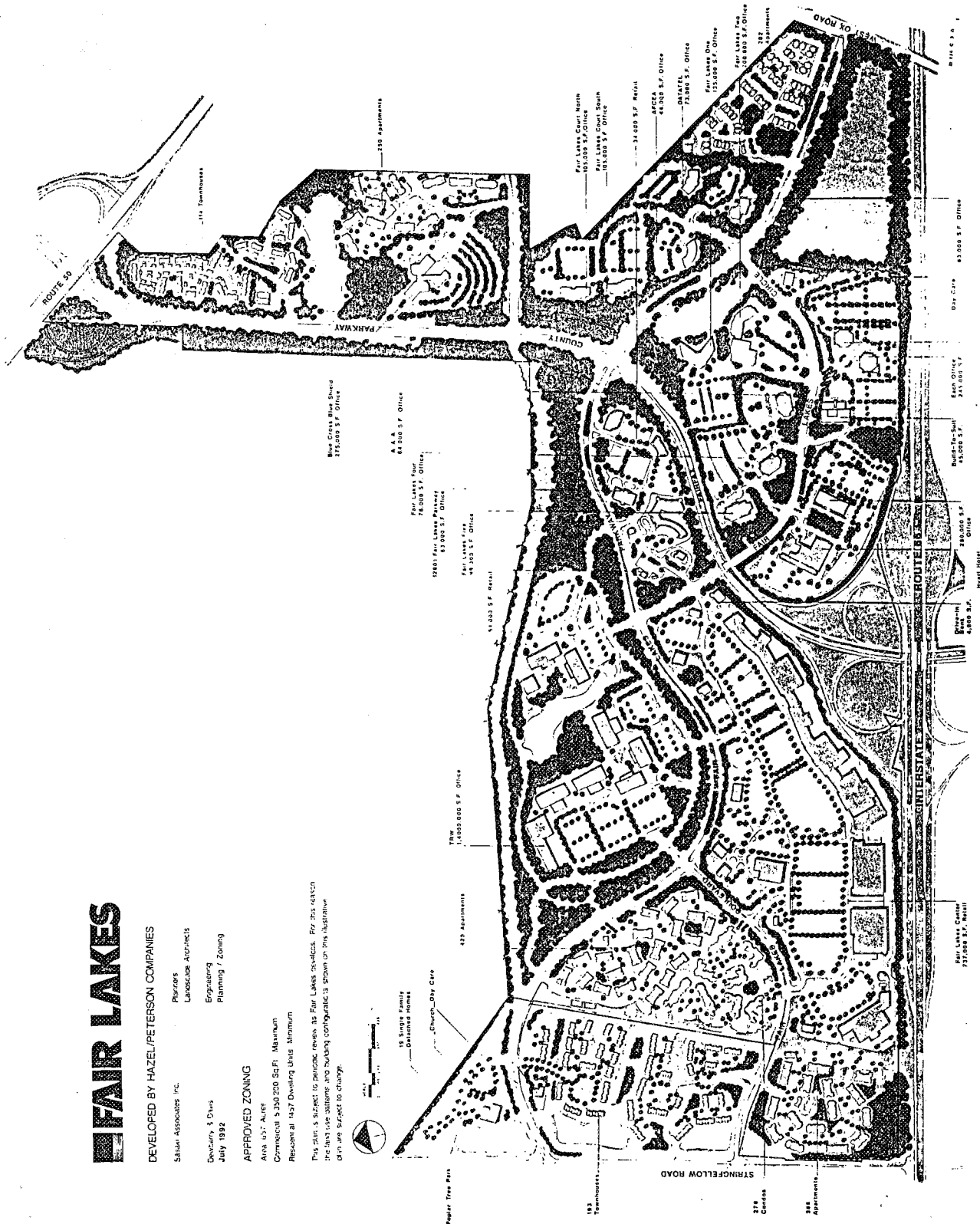
DEVELOPED BY HAZEL/PETERSON COMPANIES

- Silman Associates Inc.
 - Planners
 - Landscape Architects
 - Engineers
 - Planning / Zoning
- DeVaux, S. Davis
 - July 1992

APPROVED ZONING

AIM 637: ALUE
 Commercial 5,350-250 Sq.Ft. Maximum
 Residential 457 Dwelling Units Minimum

This plan is subject to periodic review by Fair Lakes residents. For this reason the lot size, setbacks and building configurations shown on this illustrative plan are subject to change.



Cultural attitudes

Since the early years of the 20th century, people have disdained living near factories. Widespread use of the automobile gave working people new housing choices: suburbia blossomed. Although people in many communities continue to live near mines, mills, or factories, we found that many respondents in Dartmouth resisted the idea of integrating housing with industrial uses. Their reasons reflect two concerns: equity and conflict.

No one wants to introduce ghettos where the poorest workers live out of desperation. Some respondents thought that building housing in industrial areas offered the opportunity for new forms of "company towns", where workers lived at the discretion of the boss. Would developers build high quality housing in industrial areas? And if they did, could workers afford it? We must recognize the possibility that affordable units built in working industrial zones could well constitute low amenity housing with poor construction values. In business parks, like Fair Lakes, housing quality is high, but so is cost. As long as the market drives housing prices and availability, it seems unlikely that building housing in industrial parks will alleviate concerns about equity.

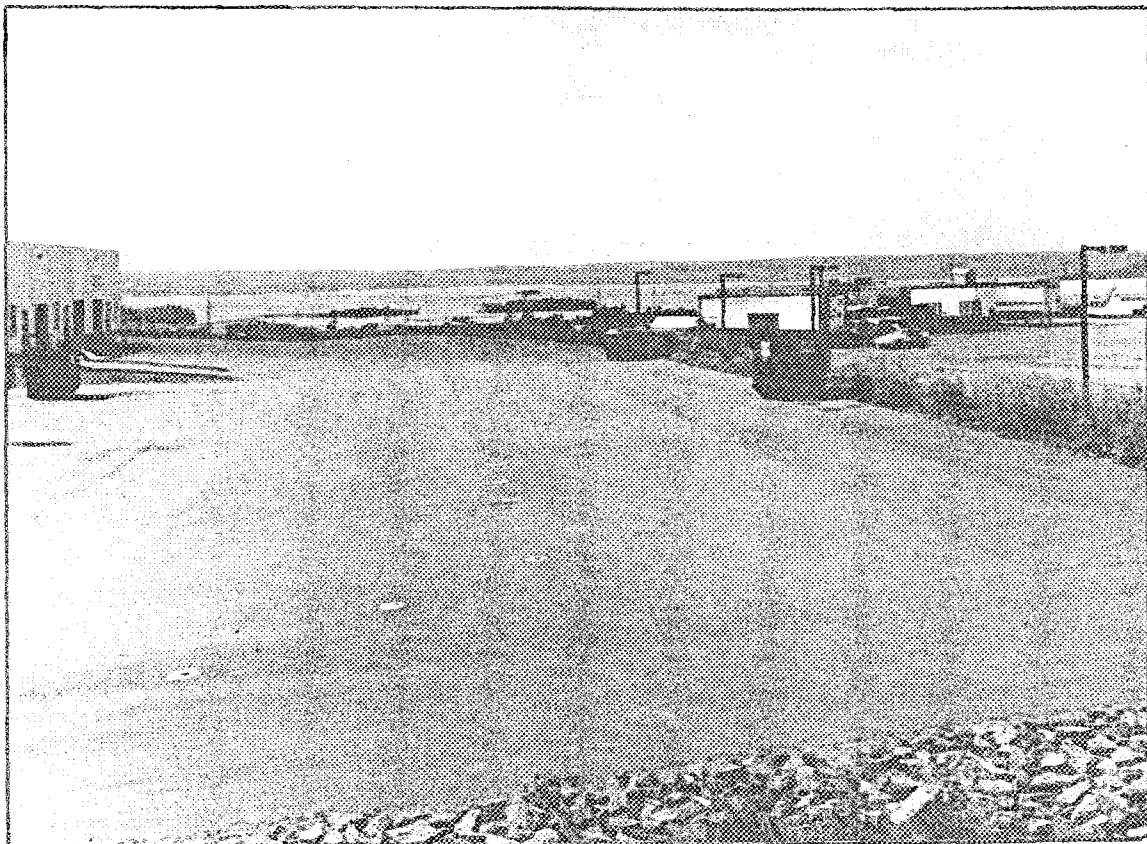
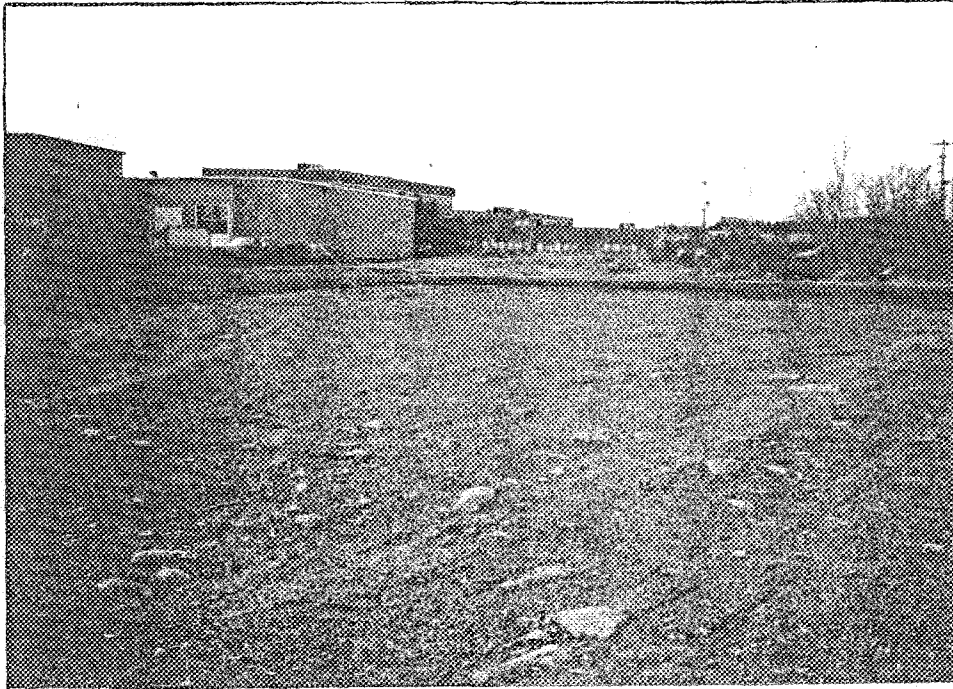
Business owners and park managers fear that bringing residents into industrial areas will create conflicts over the use of land. People complain about noise, odours, traffic, and bright lights in residential areas. If people move into industrial areas they may make it impossible for businesses to operate normally. NIMBYism, the syndrome that makes it hard to find sites for group homes and affordable housing, could destroy a business climate so carefully constructed by years of segregating industrial uses.

Household needs

People have to meet their requirements for safety and health in their homes. Traffic concerns, distance from amenities, and potential risks from industrial activities may limit the ability of many households to meet their needs in industrial areas. Planners have designed industrial parks for cars and trucks, not for pedestrians. Households without cars would find industrial areas inhospitable. Parks, playgrounds, and schools may not be available close at hand.

PHOTOGRAPHS

Large areas of cleared or paved land in Burnside appears under-utilized for much of the work day. Not all "vacant" patches present real opportunities for alternative uses, however. Large trucks need room to back into loading bays. Seasonal requirements may leave firms with no choice but to keep storage areas available.



Housing options

Households make housing choices in the context of a variety of factors: cost, amenities, quality, and location of work, friends, and schools. When people have affordable, attractive options within a ready commute to work, they will likely not choose to live in industrial parks. A community like Dartmouth offers people too many choices to make the industrial park viable.

In areas with high land costs or limited housing choices, housing in industrial areas may prove a viable alternative. For people to consider the option, developers would have to offer good quality housing in attractive settings.

Before people will consider investing in providing housing in industrial areas, we will need to safeguard viability over the long term. If, for example, developers construct an apartment building in 1995 they will need to know that neighbouring uses will not interfere with the project. Land regulations will need to offer some predictability for the investment. Alternatively, we can seek ways to encourage residential development as an adaptive response to opportunities. If, for instance, developers use mobile units or modular construction to meet identified needs, they can quickly respond to a market; when the market declines, they can adapt the site for re-use.

Community context

Given Dartmouth's efforts to revive the downtown and to stem the flow of households to the county, establishing a new residential node in Burnside makes no sense. The municipal and regional context of housing and industry makes integrating housing into Burnside unreasonable. Other communities with different problems and prospects might find the idea of integrating industry and housing more attractive.

If we build housing in industrial areas can we create a meaningful community? Planners understand how difficult it proves to design neighbourhoods that meet people's needs for identity and community. Can an industrial area ever develop a sense of place? Does building homes in industrial zones contribute to decentralization and the growth of "edge cities" (Garreau 1991)? Many would argue that it does.

Economic context

It may prove affordable to build multi-family rental apartments in some areas of Burnside, but given rental vacancy rates in the area it makes little sense. Developers would take on considerable risk without hope of significant returns. Communities like Dartmouth have invested so much in developing industrial land, they would receive insufficient tax revenues to make

residential conversion attractive. Potential residents could benefit from low-cost housing, were it available in the Park, but high vacancy rates in the region reveal a plethora of other choices.

Regional context

Regional disparity creates special problems for the Maritime provinces. Away from the economic heartland of Canada, the region began de-industrializing in the last century. Incentive packages funded industrial expansion during the 1970s and 80s, but have disappeared in the recessionary 90s. Industrial parks compete for fewer employers. A depressed real estate market undermines the value of all types of land. High unemployment and low tax revenues create an atmosphere of desperation. Integrating housing into industrial areas is a moot point: no one is building anything in the early 1990s.

Inter- and intra-regional competition contributes to the problems of industrial parks in areas like Nova Scotia. Every community has its own industrial park. Communities offer concessions to businesses as they woo new employers. Some parks developed with tax dollars to promote industrial development now advertise themselves as retailing centres: wholesale distributors threaten to displace viable local businesses established downtown or in malls built by private entrepreneurs. Harsh realities have clouded the purpose that drove early industrial planning.

In regions with strong growth and high land values, developing housing in industrial areas could prove profitable. Workers make trade-offs in finding accommodations: e.g., commuting time, amenities, cost. Where people face long commutes to find affordable accommodations, housing near work may become more desirable. Where the region has an interest in stimulating growth around employment nodes, then integrating housing and industry makes sense.

Government policy

Various levels of governments attempted through the post-war period to stimulate industrial development through providing infrastructure. Dartmouth's stated policy is to promote industrial development in Burnside.

After the Second World War, the federal government launched several initiatives to stimulate development. Central Mortgage and Housing Corporation promoted town planning and programs to provide housing for Canadians. During the 1960s Nova Scotia took advantage of federal funds to acquire land for affordable housing. The Province bought thousands of acres around the Metro area, eventually servicing large developments in Dartmouth, Sackville, and Halifax County. As a result of the Province's commitment to affordable housing, Nova Scotia enjoys reasonable housing prices. By providing low and moderate cost lots, the Province

prevents the kind of monopoly ownership that has driven up land values in other metropolitan areas.

Another set of government programs promoted industrial expansion after the war. The Department of Regional Industrial Expansion, later the Department of Regional Economic Expansion, encouraged regional planning and resource development. Regional centres received funds to build industrial infrastructure. With federal dollars, Dartmouth began to acquire land to develop Burnside. Burnside currently competes with other industrial parks for limited public funding.

With this clear separation of public purpose in land, local officials express considerable reluctance to convert industrial land to residential. The Province had a clear public purpose in servicing land for housing. Municipal officials have had, as their primary concern, meeting the needs of industry. In other areas of the country local governments may attempt to provide both residential and industrial land. In Nova Scotia, however, they see their mandate as limited to providing the more expensive industrial land.

The positive land use controls of public investment in infrastructure no longer work in the current climate. Governments resist new expenditures, preferring to reduce the large deficits generated in the post-war period. Without the resources to continue investing in development, the national commitment to development seems to weaken. Governments need new strategies for enhancing the sustainability of industrial areas.

Neither do the negative land use regulations meet the needs of many communities today. Segregating uses satisfies some concerns but limits the ability of businesses to adapt to changing circumstances. Land regulation in the late 1990s has to guarantee compatibility, quality, and predictability; it also must permit flexibility.

Our review of land use regulations highlighted a number of mechanisms that governments can consider in developing sustainable approaches to managing industrial areas. **Overlay zones of special districts** would allow governments to designate portions of industrial parks for redevelopment by adaptive policies. **Conditional use permits** would approve uses provided that particular **performance standards** can be met.

If governments hope to prevent continued decline in industrial areas, they will need to reformulate their policies and practices. Encouraging adaptive re-use and adaptive co-use of industrial facilities and sites should be part of a strategy for the future. We have to begin now to think about how industrial parks may "evolve" into new forms for the changed economy of the next century.

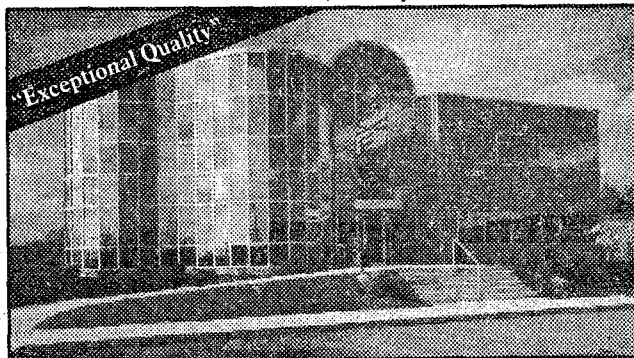
Public Purpose in Servicing Land

	HOUSING	INDUSTRIAL LAND
Federal agency	CMHC	DREE
Government level in Nova Scotia	Province of NS - Dept. of Housing	Metropolitan Area Planning Commission City of Dartmouth
Purpose	Acquire and service residential land	Acquire and service industrial land
Current condition	Abundant supply of residential land at affordable prices Low inflation	Abundant supply of vacant industrial land Price deflation

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741037

RECOMMENDATIONS

Our analysis shows that industrial parks have the space to accommodate housing, but the viability of the opportunity depends on many factors. Industrial parks have the physical infrastructure to meet most demands, but lack the social infrastructure to support a community of residents. Parks have vast areas of wasted pavement and air space over buildings, but industrial activities may prove poor neighbours for residents seeking quiet enjoyment. Are industrial areas suitable for housing people? They remain a poor second choice for most households.

For the past decade or more, planners have advocated increasing urban densities. Higher density improves the efficiency of infrastructure, public transit, and community services; it offers greater hope of protecting rural landscapes. Urban development schemes across North America regularly propose infill housing and high density nodes. As we have found time and again, however, community residents often react negatively to plans for high density. People continue to want low density suburban lifestyles. Residents don't necessarily support environmental protection, mixed uses, or affordable housing. This cultural resistance to the precepts of sustainability flavours reactions to the idea of integrating housing into industrial areas.

In judging each case for increasing density through urban infill, planners will consider the tradeoffs and advise decision makers accordingly. Planners would likely not evaluate infill potential in industrial areas unless all other land within the municipality were already developed. If the community decides to pursue development in industrial areas, planners would have to determine that the infrastructure could handle new users, that neighbouring uses proved compatible, and that residential development in that area would contribute to local and regional goals.

Given the results of the case study, we offer the following recommendations to local governments.

Adopt regulatory mechanisms that allow flexibility to adapt to new circumstances. Overlay zones, special districts, conditional use permits, and performance zoning provide tools for redeveloping portions of the urban environment. Communities that plan for re-use will avoid finding themselves with outdated assets.

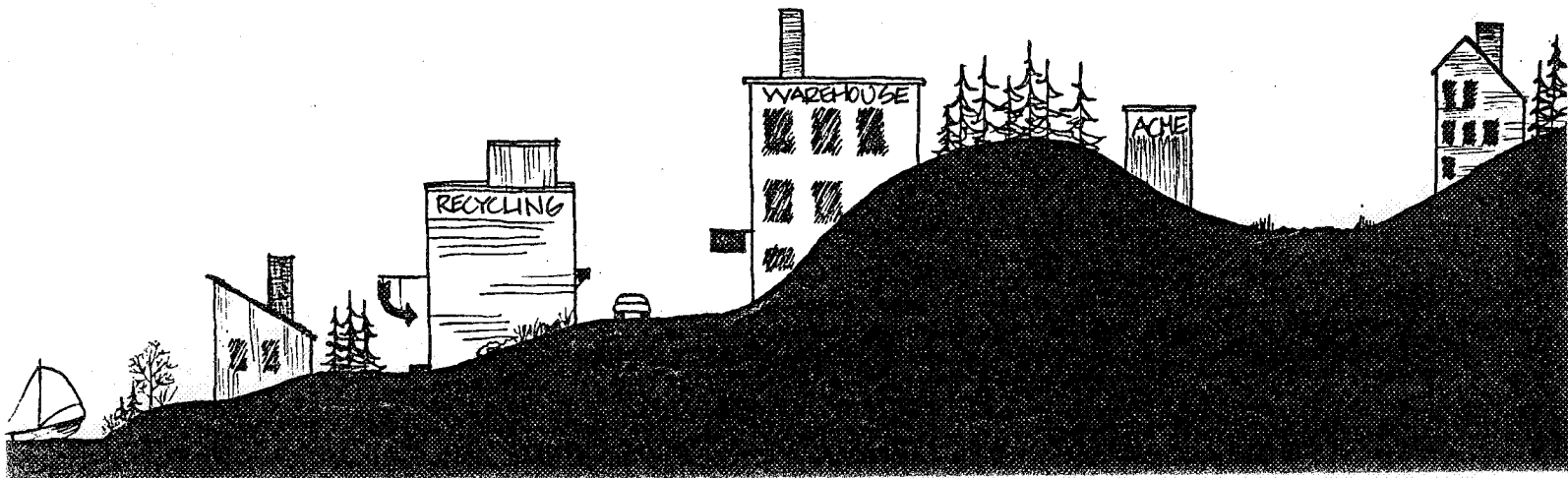
Promote the use of mobile units, reusable buildings, and modular construction (for quick assembly). Adaptive re-use of facilities and co-use of spaces will be necessary in the rapidly changing economic climate of the 21st century. Companies that can adjust quickly to new market requirements and opportunities will prove most viable.

Communities need to respond to rapidly changing circumstances. The rigid land use regulatory mechanisms which have predominated in the past must yield to tools better able to meet new objectives. Similarly, traditional building practices that create rigid and expensive structures seem impractical in an economic context that requires continual adjustment and adaptation. Mobile units, reusable buildings, and modular construction may allow planners and site users to respond to new needs without the incredible expense involved in normal construction. Increasingly we need to plan for re-use of our urban areas, not just after they reach the end of their useful life but even as we initiate them.

For decades, planners have advocated a regional approach to land use planning. Regional planning has not worked well in Nova Scotia (Grant 1989). Local governments who participate in the Metropolitan Authority for Halifax-Dartmouth continually bicker over vital issues. Each municipality blithely pursues its own interests in developing industrial land. That strategy has clear limitations in an economic environment of declining affluence, constraint, and global competition. Greater cooperation between local governments will improve the prospects for finding appropriate development strategies and sound housing policies for the 21st century.

In some conditions, some municipalities will decide to add residential uses to the mix in an industrial park. Other communities will find that choice inappropriate. In each case, communities will consider their objectives, the regional context in which they find themselves, and the viability of the proposed mix. While we conclude that it seems inappropriate at this time to add housing to the mix in Burnside Industrial Park, we believe that planners should continue to investigate the idea for Canadian communities. Further research could develop guidelines and policies to facilitate such mixed use projects.

APPENDIX
AND
BIBLIOGRAPHY



QUESTIONNAIRE FORM

Firm or contact: _____

Date: _____ '93

Survey: Alternative and Complementary Uses in the Industrial Park

1. Do you favour allowing a greater diversity of uses in industrial parks? (If yes, which ones. If no, why not?)
2. Do you think it is feasible to house people in a modern industrial park?
 - b. Do you think it is appropriate to build housing in Burnside Industrial Park?
3. What benefits do you think could accrue from building housing in an industrial park?
 - b. Do you think the city would stand to gain?
 - c. Do you think businesses in the park would stand to gain?
 - d. Do you think residents in the park would benefit?
4. What disadvantages do you foresee from housing people in an industrial park?
 - b. What costs might the city incur?
 - c. Would housing present any problems for businesses in the park?
 - d. Would the residents of the park face particular problems or risks?
5. What kinds of long-term impacts would you predict might result from building housing in an industrial park?
6. What kinds of impacts would you predict might result from including other alternative uses in the industrial park?

Thanks for your assistance.

Return to:

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Nova Scotia College of Art and Design
5163 Duke Street, Halifax,
NS, B3J 3J6 Fax: 423-0121

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