THE RELATIONSHIP BETWEEN URBAN SOIL CONTAMINATION AND HOUSING IN CANADA

PREPARED FOR CMHC BY GARDNER CHURCH & ASSOCIATES

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THE RELATIONSHIP BETWEEN URBAN SOIL CONTAMINATION AND HOUSING IN CANADA

EXECUTIVE SUMMARY

Housing and Urban Soil Standards - Interdependent Issues

This report was prepared in response to a request by CMHC for a policy overview of the relationship between housing and urban soil contamination, particularly as reflected in post-industrial lands. Urban soil contamination is an emerging public policy issue. While air and water quality have been on the environmental agenda for some time, concern about soil contamination has been restricted to isolated "hot spots" until recently. The spectre of sites which have experienced serious chemical or radiation spills is a familiar one to viewers of television news. In both The United States and Canada there has been a concerted effort to deal with these isolated sites which threaten both public health and the wider environment. Now however, as a result of improved measurement and analysis capacity, the concern has spread from these areas of significant pollution to any land on which previous use suggests the potential for contamination.

In almost every Canadian city, large tracts of industrial land have been emptied of their economic activity as the impact of economic restructuring is felt. Where the economic heart of Canada once pounded, lie abandoned buildings, padlocked properties and empty parking lots. Because Canada's cities grew around these industries, the lands in question lie in the heart of urban Canada. There is no reliable count of these lands but they number in the dozens of thousands of hectares. They represent a significant economic asset and an important opportunity to revitalize cities.

One of the most challenging problems confronted in trying to re-use Canada's urban post-industrial lands is possible soil contamination. The current and emerging standards and processes for dealing with soil contamination require evidence that no contamination is present prior to permitting reurbanization. And in the event that contaminants are found, the process of removing the contamination can render the property commercially valueless.

This overview report focuses on the relationship between housing and soil contamination.

They are related to each other economically in at least two ways. Housing affordability and its accessibility in urban areas are directly contingent on the degree of cost sensitivity present in soil standards. Second, the housing industry is a principle agent of remediation but will only be able to remediate lands if there is an economic use for lands after they have been brought to standard. Urban soil contamination and housing are related in the achievement of social objectives. The principle land use need in inner cities in North America will be for affordable housing and employment lands. In an era of limited public financial resources, the market will be required to meet the largest portion of the housing in our city centres, serious social and community problems will result. Since post-industrial lands are one of the few sources of re-development lands in cities, the costs of remediation will directly impact the inner city housing objectives. A further relationship, of particular interest to CMHC, is the need for housing occupants and owners to determine and alleviate any risks that soil contamination may present in existing properties.

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The issues are related in the achievement of environmental objectives as well. The flight of housing to single purpose, low density suburbs has created two of the most compelling environmental issues of our time. The excessive land consumed by such development is an agricultural and environmental issue in its own right. In addition, the companion effect of urban sprawl - excessive pollution from the necessarily extensive use of autos in such communities - is a critical environmental concern. Both housing and environmental policy require an alternative urban form. How we approach soil contamination will be one of the determinants of our success in finding such an alternative.

It is not an overstatement that housing and soil contamination are interdependent issues. The remediation of most potentially contaminated areas depends on the housing industry to discover economically viable uses for the lands. On the other hand, the standards set for soil remediation will affect the nature, amount and affordability of housing in major cities.

The Report

Section 1

The first section is a brief introduction and review of the mandate of the report.

Section 2

The report briefly reviews the activities of public agencies active in the field of soil contamination and describes the evolving reality created by these institutions. The review examines the role of several National agencies and groups, some Provincial agencies (in areas where the issues are particularly controversial) and a few local agencies that are involved to a greater than usual degree in the policy issues involved.

The issue of contaminated soils as it relates to housing is being dealt with in a fragmented and unstructured manner. The two biggest preoccupations and the largest amount of work relate to determining liability for contaminated sites and setting remediation standards; yet these are not addressed together. Furthermore, the agencies involved are pursuing the issue without coordination. There exists little co-operation or sharing of information among the stakeholders representing differing perspectives.

There is no doubt that liability will remain a dominant concern as long as remediation is coupled with redevelopment. The summary of the report of current activities concludes:

The dependence on standard setting is also understandable from the perspective of those whose interests is clarification of liability. The preoccupation with liability and standard setting, however, has led to other important factors, most notably risk assessment being overlooked.

Where there is an acknowledged concern about risk assessment, there is little evidence of an even handed effort to balance economic, social and environmental interests. The goal of setting standards is to reduce human and environmental risks at acceptable and reasonable economic and social costs. The agencies involved want a quick determination of standards but have not adequately determined the relationships among the various risks involved.

This status report, therefore, demonstrates two important characteristics of aspects of the soil remediation issue. First, progress on the issue is being conducted in a fragmented and uncoordinated manner. Second, the overwhelming preoccupation has been with liability and standards without sufficient regard to balancing the competing risks involved. The risk assessment processes being considered appear to examine environmental risk but do not include risks associated with economic, social community and fiscal factors. With this understanding, it is now possible to review and analyze the major issues being raised.

Section 3

The next section of the report examines the policy issues raised by soil contamination and reviews the perspectives of a number of the public and private interest groups. The report identifies and explores the four categories of policy issues raised by soil contamination: environmental, economic, community and social, and fiscal issues.

The review of public policy issues and stakeholder perspectives related to soil contamination focuses on housing and examines it in the four categories described above. A summary of the findings as seen by the stakeholders follows.

Environmental Issues

An important environmental issue identified by many interests relates to the environmental costs of urban sprawl which are exacerbated when downtown lands are effectively removed from the market by the uncontrolled risk of soil contamination. Another environmental issue raised is the apparent failure to link standards of remediation to risk of dangerous exposure of contaminants to receiver organs. It is widely perceived that the current approaches to soil contamination focus on the avoidance of liability to a far greater degree than on the discovery and remediation of serious (and high risk) contamination.

It is not difficult to conclude that the present approaches to soil contamination do not adequately deal with the environmental imperatives.

Economic Issues

Understandably, the policy issues that are not directly environmental but are raised by soil contamination, have not received much attention in the debate over remediation. Several parties raised the concern that downtown lands are significant economic resources and are in danger of being economically marginalized by the current approach to soil contamination. The report discusses the importance of directing urban growth back into cities instead of onto fringe farmlands. It also identifies a concern with the complex and confusing protocols now emerging and reflects on the concerns raised by financial institutions that ability to pay and responsibility should not be confused.

Social and Community Issues

One of the little recognized effects of the soil contamination controversy is the impact it has on social and community concerns. A system which forces large tracts of land to remain idle contributes to serious erosion of communities in loss of economic opportunity, physical intrusion and increased worry and frustration. By inhibiting intensification in downtown Canada, the present approach to soil contamination is seen by some local groups to frustrate opportunities for affordable housing and job creation.

Finally it is apparent that public understanding of the soil contamination issue is not good. The terminology used in the debate generates fears beyond reason. Affected populations need to be informed realistically about the nature of threats and especially the lack of threats.

Fiscal Issues

The prime fiscal issue related to soil contamination is the relative benefit to governments of redeveloping already serviced downtown lands versus developing rural lands. A related issue is that government is a large scale owner of contaminated sites and has a fiscal interest in managing them coherently and reasonably. An additional fiscal issue may be the lower costs to publicly assisted affordable housing providers if they can benefit from the existence of already serviced land.

Section 4

The fourth section of the report reviews the relationship between housing and soil contamination in the light of current practices and perspectives on the issue. The discussion focuses on the implications of soil contamination on housing operators, housing supply policies and housing financing. There are serious ethical, operating, supply and financing issues raised by soil contamination.

Two of theses issues merit review here. The issue of revitalization of downtown Canada is only an issue if markets exist in those areas. An economic study undertaken for this report by Economic Projections Inc. sheds light on this subject and concludes:

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"It is the finding of this report that large increases in downtown housing are feasible and in demand and can be produced without public subsidy. However, current public policies including those on soil contamination inhibit the creation of this housing... The results here suggest that there will be overwhelming demand for such units within the metropolitan environment and - if such units could be offered in the urban core at competitive prices - the potential of core densification, therefore, would be significant."

This finding is significant because:

- i) it challenges conventional wisdom in the development industry that there is a limited market for downtown housing,
- ii) it suggests a change to a thirty year trend in which new housing demand declined in city centres.
- iii) it uses conservative assumptions; it finds that even with no in-migration to urban cores, there will be a significant demand for urban housing because of the internal demographics of the cities. Thus if governments have even limited success in encouraging re-development, the demand will be even greater.

This adds considerable fuel to the argument that clear and economically realistic soil standards are important to the future of cities and to housing.

The second critical housing issue is the "time bomb" represented by those buildings that will be impossible to finance or insure because of uncertainty about contamination costs and effects.

If soil contamination continues to be equated with the mere presence of contaminants, the soil under a large number of buildings will soon come to be considered suspect. This is an issue which needs more examination by housing interests and environmental regulators.

Section 5

The report concludes with a review of the gaps in knowledge and unanswered questions which inhibit resolution of the large number of public policy issues raised. Focusing on the risk versus standards issue, it is suggested that public policy on soil contamination should be guided by a formula that considers risk and not just the existence of contaminants. Specifically it raises the question of whether a more appropriate formula is required than the simple "it exists therefore it is contaminated" approach currently used.

It speaks to the need to understand the effect of "liability chill" on entire areas of cities and of the lack of any comprehensive inventory of potentially contaminated sites. Both of these would be necessary to assess with any accuracy the social, housing and economic implications of the soil contamination issue.

There is clearly a need for representatives of the housing interests in Canada to become more actively involved in the issue. The report indicates some of the information that should be collected to permit more effective participation.

Most important however is the recognition that a continuation of a fragmented single interest approach to the issue of soil contamination will damage environmental, economic, social and housing goals.

"Any solution to the contaminated soil problem must therefore be built upon a set of goals or principles designed to:

• reduce government duplication and bureaucracy;

• develop the maximum number of contaminated downtown areas;

• ensure public health protection; and,

• meet the broadest range of environmental goals, including the key environmental goals of reducing urban sprawl and creating compact urban form"

(This statement is similar to a premise which underlies Quebec's approach to the issue. Further examination of that Province's approach thus seems warranted.)

Finally, CMHC may wish to examine its role in resolving the confusion over contaminated soils. A number of the stakeholders surveyed expressed concern over the Corporation's leadership on this matter. To most stakeholders CMHC and the CCME define the policy environment, and several interviewees thought the implications of the Corporation's insurance guidelines had not been fully considered and were "not conducive to housing development."

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LA RELATION ENTRE LA CONTAMINATION DU SOL URBAIN ET LE LOGEMENT AU CANADA

RÉSUMÉ

Normes relatives au logement et aux sols en milieu urbain -Questions interdépendantes

Ce rapport a été préparé par suite de la demande de la SCHL de revoir la relation entre le logement et la contamination des sols en milieu urbain, en particulier des sites d'anciens établissements industriels. La qualité de l'air et de l'eau figure au calendrier des activités écologiques depuis quelque temps, mais les préoccupations à l'égard de la contamination des sols étaient réservées jusqu'à tout récemment à certains «points chauds». Le danger des terrains ayant subi d'importants déversements de substances chimiques ou radioactives est familier pour ceux qui suivent les nouvelles télévisées. Tant aux États-Unis qu'au Canada, la concertation des efforts a permis de s'attaquer à ces terrains isolés qui portent préjudice à la santé publique et à l'environnement. Mais maintenant, par suite de l'amélioration des techniques de mesure et d'analyse, l'inquiétude s'étend de ces secteurs fortement pollués à tout lieu dont l'usage précédent le prédispose à la contamination.

Dans presque toutes les villes canadiennes, de vastes sites industriels ont été désaffectés à mesure que s'est fait ressentir l'impact de la restructuration économique. Là où le coeur de l'économie canadienne battait jadis à un rythme trépidant gisent des bâtiments abandonnés, des propriétés cadenassées et des stationnements déserts. Étant donné que les villes canadiennes se sont développées autour de ces établissements, les terrains en question se trouvent au coeur des villes. Il n'existe aucun dénombrement fiable de ces terrains, mais ils se chiffrent à des dizaines de milliers d'hectares. Ils représentent un actif économique considérable, sans compter qu'ils fournissent une excellente occasion de revitaliser les villes.

L'un des plus grands défis que pose la réutilisation des sites urbains d'anciens établissements industriels est la contamination possible du sol. Les normes et procédés en vigueur ou en voie d'émerger sur le plan de la contamination du sol requièrent des preuves qu'il n'y a pas de contamination avant que soit autorisé le réaménagement. Advenant la découverte de contaminants, l'assainissement de la propriété risquerait d'annihiler sa valeur commerciale.

La présente vue d'ensemble porte sur la relation entre le logement et la contamination du sol.

Le logement et la contamination du sol ont au moins deux liens économiques en commun. D'une part, l'abordabilité et l'accessibilité du logement en zone urbaine dépendent directement de la rigueur des normes de décontamination du sol. D'autre part,

le secteur du logement contribue beaucoup à l'assainissement, mais il ne pourra décontaminer les sols que dans la mesure où ils auront une utilisation économique après avoir été rendus conformes aux normes. La contamination des sols en milieu urbain et le logement sont liés dans la poursuite d'objectifs sociaux. Il faudra surtout utiliser les sols des quartiers urbains de l'Amérique du Nord pour aménager des logements abordables et des terrains propices à la création d'emplois. À une époque de restrictions financières publiques, le marché devra absorber la plus grande partie de la demande de logement. Si le marché ne peut pas répondre aux besoins d'hébergement des ménages à revenus faibles et modérés des centres-villes, de graves problèmes sociaux et communautaires surgiront. Puisque les sites d'anciens établissements industriels constituent une des rares occasions de réaménagement urbain, les coûts d'assainissement influeront directement sur les objectifs de logement au coeur des villes. Un autre lien, qui présente un intérêt particulier pour la SCHL, est le fait que les occupants et les propriétaires doivent déterminer et réduire tous les risques que la contamination du sol peut présenter dans les propriétés existantes.

Les questions ont également un lien dans la poursuite des objectifs environnementaux. L'exode vers les banlieues à faible densité d'aménagement et à vocation unique a soulevé deux des problèmes environnementaux les plus contraignants de notre temps. La surconsommation du sol à cette fin constitue un problème agricole et environnemental en soi. En outre, l'effet accompagnant l'étalement urbain - le surplus de pollution entraîné par l'utilisation nécessairement répandue des automobiles - pose une préoccupation environnementale aiguë. Les politiques du logement et de la protection de l'environnement requièrent une nouvelle forme d'urbanisation. La façon d'aborder la contamination du sol déterminera à quel point nous réussirons à en découvrir une.

On peut dire sans exagérer que le logement et la contamination du sol sont des questions interdépendantes. L'assainissement des zones les plus susceptibles d'être contaminées dépend de la capacité du secteur du logement à trouver des destinations viables pour les terrains. Par contre, les normes établies pour l'assainissement du sol toucheront la nature, la quantité et l'abordabilité des logements dans les grandes villes.

Le rapport

Section 1

La première section tient lieu de brève introduction et revoit l'objet du rapport.

Section 2

Le rapport passe rapidement en revue les activités des organismes publics qui jouent un rôle actif dans le domaine des sols contaminés et il décrit la situation évolutive. La revue porte sur le rôle de plusieurs organismes et groupes nationaux, de certains organismes provinciaux (dans des secteurs où les questions sont particulièrement controversées) et de quelques organismes locaux qui sont plus engagés que d'habitude dans les questions d'orientation soulevées.

Le dossier des sols contaminés en ce qui a trait au logement est traité de manière fragmentée et non structurée. Les deux principales préoccupations et le plus gros du travail consistent à déterminer à qui imputer la responsabilité des terrains contaminés et à établir des normes d'assainissement; et pourtant, les deux éléments ne sont pas traités ensemble. De plus, les organismes concernés étudient le problème sans coordination. Il existe peu de coopération ou de partage d'information parmi les parties intéressées par des perspectives divergentes.

La responsabilité restera sans aucun doute un problème prépondérant tant que l'assainissement sera associé au réaménagement. Le résumé du rapport des activités courantes présente la conclusion suivante :

La dépendance à l'égard de l'établissement de normes est également compréhensible du point de vue de ceux qui cherchent à clarifier la responsabilité. La préoccupation suscitée par la responsabilité et l'établissement de normes a cependant conduit à négliger d'autres facteurs importants, plus particulièrement l'évaluation des risques.

Lorsque l'évaluation des risques pose un motif de préoccupation reconnue, peu de preuves attestent une tentative impartiale d'équilibrer les intérêts économiques, sociaux et environnementaux. Le but d'établir des normes est de réduire les risques préjudiciables aux humains et à l'environnement moyennant des coûts économiques et sociaux acceptables et raisonnables. Les organismes concernés veulent pouvoir rapidement compter sur des normes en la matière, mais ils n'ont pas bien établi les relations entre les divers risques en jeu.

Ce rapport d'état démontre donc deux importantes caractéristiques du dossier de l'assainissement du sol. Premièrement, le dossier est piloté de manière fragmentée et sans coordination. Deuxièmement, on s'est trop préoccupé de la responsabilité et de l'établissement de normes sans veiller suffisamment à contrebalancer les risques concurrents en jeu. Les processus d'évaluation des risques envisagés semblent permettre d'établir les risques pour l'environnement mais non ceux qui sont associés aux facteurs économiques, sociaux, communautaires et financiers. Ainsi, il est maintenant possible d'examiner et d'analyser les principales questions soulevées.

Section 3

La section suivante du rapport est consacrée aux questions d'orientation soulevées par la contamination du sol et aux points de vue d'un certain nombre de groupes d'intérêts publics et privés. Le rapport cerne et sonde les quatre catégories de questions d'orientation soulevées par la contamination du sol : les questions environnementales, économiques, communautaires et sociales, et financières.

L'examen des questions d'orientation publique et des points de vue des parties concernées qui touchent la contamination du sol est axé sur le logement et les étudie en fonction des quatre catégories susmentionnées. Un résumé des conclusions établies par les parties concernées est fourni ci-après.

Questions environnementales

Une importante question environnementale relevée par de nombreuses parties intéressées touche les coûts de l'étalement urbain qui empirent lorsque les terrains des centres-villes sont effectivement supprimés du marché en raison du risque incontrôlé de contamination du sol. Une autre question environnementale soulevée porte sur le défaut apparent de lier les normes d'assainissement au risque d'exposition dangereuse aux contaminants pour les organes récepteurs. On estime généralement que les façons courantes d'aborder la contamination du sol tentent beaucoup plus d'éviter la responsabilité que de découvrir et d'enrayer de sérieux cas (à risques élevés) de contamination.

Il n'est pas difficile de conclure que les façons courantes d'aborder la contamination du sol ne cadrent pas bien avec les impératifs environnementaux.

Questions économiques

Naturellement, les questions d'orientation qui n'ont pas de rapport direct avec l'environnement, mais qui sont soulevées par la contamination du sol n'ont pas obtenu beaucoup d'attention dans le débat sur l'assainissement. Plusieurs parties s'inquiètent puisque les terrains des centres-villes constituent d'importantes ressources économiques et risquent d'être marginalisés sur le plan économique par la façon courante d'aborder la contamination du sol. Le rapport décrit l'importance de réorienter la croissance urbaine vers l'intérieur des villes plutôt que vers les terres agricoles périphériques. Il relève également un problème touchant les protocoles complexes et déroutants qui apparaissent actuellement et commente les préoccupations soulevées par les établissements financiers, soit que la capacité de payer et la responsabilité ne doivent pas être confondues.

Questions sociales et communautaires

Une des conséquences vaguement reconnue de la controverse entourant la contamination du sol est l'incidence exercée sur les problèmes sociaux et économiques. Un système qui contraint à garder de larges étendues de terrains inoccupées contribue à un sérieux effritement des collectivités déclenché par une perte des débouchés économiques, une intrusion physique et un sentiment accru d'inquiétude et de frustration. Certains groupes locaux estiment que la façon courante d'aborder la contamination du sol, qui interdit la densification du centre des villes canadiennes, contrecarre les possibilités de logement abordable et de création d'emplois.

Enfin, il est évident que le public comprend mal la question de la contamination du sol. La terminologie utilisée dans le débat soulève des craintes déraisonnables. Les populations touchées doivent être informées avec réalisme de la nature des dangers et spécialement de l'absence de dangers.

Questions financières

La principale question financière concernant la contamination du sol est l'avantage relatif pour les gouvernements de réaménager des terrains urbains déjà viabilisés plutôt que d'aménager des terrains en secteur rural. Le fait que le gouvernement est un propriétaire de grande envergure de terrains contaminés et qu'il a financièrement intérêt à gérer ces terrains de façon cohérente et raisonnable constitue une autre question connexe. Une autre question financière peut être les coûts réduits d'aide publique aux producteurs de logements abordables s'ils peuvent profiter de l'existence de terrains déjà viabilisés.

Section 4

La quatrième section du rapport examine la relation entre le logement et la contamination du sol en fonction des méthodes et des perspectives courantes. La discussion est axée sur les conséquences de la contamination du sol pour les exploitants, les politiques de prestation et le financement du logement. La contamination du sol soulève d'importantes questions touchant la déontologie, l'exploitation, la prestation et le financement du logement.

Deux de ces questions méritent qu'on s'y arrête. La revitalisation du centre des villes canadiennes ne pose problème que s'il existe des marchés dans ces zones. Une étude économique entreprise pour les besoins du présent rapport par Economic Projections Inc. jette la lumière sur ce sujet et conclut :

«Ce rapport révèle que d'importantes augmentations des logements dans les centres-villes sont possibles et demandées et que ces logements peuvent être produits sans subventions publiques. Cependant, les politiques publiques actuelles, y compris celles qui touchent la contamination du sol, empêchent la création de ces logements... Les résultats à ce stade indiquent qu'il y aura une très forte demande pour ce type de logement en milieu urbain et - si de tels logements pouvaient être offerts dans les centres-villes à des prix concurrentiels - leur possibilité de densification serait donc importante.»

Cette constatation est importante pour les raisons suivantes :

- i) elle conteste la croyance populaire répandue au sein du secteur de l'aménagement voulant qu'il y ait un marché limité pour le logement dans les centres-villes;
- ii) elle indique un changement de la tendance qui date de trente ans selon laquelle la demande de logements neufs a accusé une baisse dans les centres-villes;
- iii) elle fait appel à des hypothèses conservatrices; elle révèle que même sans migration vers les centres urbains, il y aura une demande importante de logements à cause de la démographie interne des villes. Donc, même si les gouvernements ont remporté un succès limité en encourageant le réaménagement, la demande sera encore plus grande.

Cela renforce considérablement l'argument selon lequel des normes claires et économiquement réalistes concernant le sol sont importantes pour l'avenir des villes et du logement.

La deuxième question capitale concernant le logement est la «bombe à retardement» que représentent ces immeubles qu'il sera impossible de financer ou d'assurer à cause de l'incertitude occasionnée par les coûts et les effets de la contamination.

Si la contamination du sol continue à être assimilée à la simple présence de contaminants, le sol sous un grand nombre d'immeubles sera bientôt considéré comme suspect. C'est une question que les parties intéressées par le logement et les législateurs environnementaux doivent approfondir.

Section 5

Le rapport conclut par un examen des lacunes dans les connaissances et des questions laissées sans réponses qui empêchent de résoudre le nombre important d'éléments d'orientation publique soulevés. En se concentrant davantage sur la question des risques plutôt que des normes, cette section indique que la politique publique sur la contamination du sol devrait être guidée par une formule qui tient compte des risques et non pas seulement de l'existence de contaminants. En particulier, elle s'interroge sur le besoin d'une formule plus appropriée que la simple approche courante «il y a contaminants, donc il y a contamination».

La section traite du besoin de comprendre l'effet de «refroidissement de la responsabilité» sur toutes les zones urbaines et de l'absence de toute liste complète des terrains susceptibles d'être contaminés. Ces deux points seront nécessaires pour évaluer avec une certaine précision les conséquences sociales, résidentielles et économiques de la question de la contamination du sol.

Il faut manifestement que les représentants des intérêts résidentiels au Canada s'attaquent plus activement à cette question. Le rapport indique une partie de l'information à réunir pour permettre une participation plus efficace.

Toutefois, le plus important est de reconnaître que le maintien d'une approche fragmentée à intérêt unique à l'égard de la question de la contamination du sol nuira aux objectifs environnementaux, économiques, sociaux et résidentiels.

«Toute solution au problème du sol contaminé doit donc reposer sur une ensemble d'objectifs ou de principes conçus pour :

réduire le chevauchement et la bureaucratie du gouvernement;

aménager le plus grand nombre possible de zones contaminées des centres-villes; et

atteindre la plus grande variété possible d'objectifs environnementaux, y compris les grands objectifs environnementaux visant à réduire l'étalement urbain et à créer une forme urbaine compacte.

(Cet énoncé ressemble au principe justifiant l'approche de la province de Québec sur ce plan. Un examen approfondi de cette approche semble donc justifié.)

En dernier lieu, la SCHL voudra peut-être examiner son rôle en levant la confusion touchant les sols contaminés. Les diverses parties interrogées ont exprimé des doutes quant au leadership de la Société sur cette question. Pour la plupart des parties concernées, la SCHL et le CCME définissent le cadre politique et plusieurs parties interrogées ont jugé que les répercussions des lignes directrices de la SCHL en matière d'assurance n'avaient pas été envisagées et «qu'elles ne favorisaient pas l'aménagement résidentiel».



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<u>REPORT TO CMHC ON THE RELATIONSHIP BETWEEN URBAN SOIL</u> <u>CONTAMINATION AND HOUSING IN CANADA</u>

SECTION 1

INTRODUCTION

This overview report was prepared in response to a request from the Research Division of CMHC for an evaluation of the housing related issues associated with contaminated soils in urban settings. The terms of reference require a review of:

- current activities in the field;
- the issues, from the perspective of various interest groups;
- the relationship between housing and soil contamination.

this report explores these matters within the economic and social and environmental context of urban lands in Canada.

SCOPE AND REFERENCES

The report is a brief survey of the issue of urban soil contamination and its relationship to housing in Canada. It is not the intention of CMHC nor the consultant that the report be either exhaustive or detailed. The intent is to provide an overview of the current state of the relationship, the views of interested parties and to point to areas of concern or gaps in our knowledge.

With some exceptions, the views attributed to organizations and groups resulted from discussions with members or officers and only where pre-authorized have individuals been associated with specific views. A list of the people and organizations contacted can be found as Appendix 2 to this report. Where positions have been documented, the report acknowledges them but in the interests of clarity and brevity rarely quotes from them.

CONTEXT

It is evident that environmental sustainability is a priority for all governments in Canada. Governments recognize that environmental priorities must be integrated with economic and social priorities if there is to be any hope of a sustainable future. It is increasingly important that we learn to sacrifice economic opportunities when they conflict with environmental or social imperatives and exploit vigorously economic opportunities that are environmentally responsible and consistent with social objectives.

In North America, cities hold the key to meeting this challenge. They are the site of almost all our economic growth, most of our environmental challenges and the locus of most of the social equity issue. Over 85% of Canadians live in urban communities and a higher percentage work there. Virtually all employment growth is urban and most non urban employment is in a state of decline. Similarly, cities generate directly or through commuters the majority of carbon gases on the continent, contain the most serious chemical pollution sites and produce most of the pollution in waste water. (Although the role of agriculture in this last factor is also significant). The issue of urban poverty

while not yet as critical as in American cities is a central concern in major urban areas of Canada.

If Canada is to come to grips with the role of its cities, policy frameworks that address in an integrated manner the urban environment, urban social and community needs and the urban economy are urgently needed. An excellent example of the type of urban issue that we are not well structured to deal with is the complex relationship between housing and urban soil contamination.

Housing is an economic issue, a social issue and - in its impact - an environmental issue.

The housing industry is one of the nation's largest and traditionally has been a bellwether of the state of the Canadian economy. When the housing industry is booming, the Canadian economy is booming and when housing suffers, the economy suffers. Its impact on employment and prosperity establishes housing as an important economic concern.

Housing is a social issue. It traditionally stands with income redistribution as the most significant social issue confronted by governments in Canada. The degree to which housing is affordable and accessible dictates to a considerable extent the degree to which a community is able to meet its basic social needs. The relationship among adequate housing, mental health and social equity has been firmly established.

Housing, in the urban context, is also an environmental issue. The relationship between the location of housing and employment is recognized as the principle determinant of automobile use in cities and automobile use is the single largest source of air pollution in Canadian cities. Secondly the distribution and density of housing in a city is one of the best predictors of environmental sustainability.

Urban soil contamination is in its own right both an economic and environmental issue. Its relationship to environmental sustainability is obvious, although the degree to which it affects that goal is hotly debated. Its impact on the economy of cities can be best described as significant but not yet quantifiable.

It is however, in the relationship between housing and soil contamination that the most complex economic, environmental and social issues are raised. Soil contamination can render land virtually valueless when the cost of clean up exceeds the return on reinvestment associated with redevelopment. This in turn can serve to drive investment to the fringes of urban areas, which in turn affects housing, employment, the environment and social equity.

This is the focus of this report. It examines the relationship between urban soil contamination and housing form the perspective of the urban environment, the urban economy and urban social goals.

THE REPORT

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The second section of the report introduces the issue of urban soil contamination in the context of its implication for housing, outlines the current status of the issue and reviews the activities now under way.

The third portion of the report examines the policy issues raised by urban soil contamination in

relation to housing and reviews the perspectives of a number of stakeholders. The report identifies and explores four classifications of policy issues raised by soil contamination: environmental, economic, community & social, and fiscal issues.

The fourth section of the report examines the policy issues from the perspective of housing. Some of the issues identified in earlier sections are again raised. Because of the differing perspectives of the sections, this repetition is deemed to be useful. Section four examines the evolving housing market in the context of current resources and finds the economics of housing in the urban core to be increasingly positive. It explores the potential for achieving housing objectives there and in the process improve environmental protection, economic performance, community livability and fiscal responsibility.

The final portion of the report explores the gaps in our current knowledge about urban soil contamination and its effective regulation particularly as it impacts on housing. It outlines some of the data, information and procedures that are unknown or undeveloped and that will be required to resolve the issues.

Appendix 1

The first appendix is the text of a demographic study of demand for housing in the urban core for the next twenty years. The data analyzed relates to Toronto but it is the opinion of Economic Projections Inc. that the conclusions will apply to most urban centres because the demographic differences are not great.

Appendix 2

The second appendix is a list of people and organizations contacted during the preparation of the report. The consultant apologizes if anyone who contributed was inadvertently omitted. the list.

Bibliography

The third appendix is a brief annotated bibliography of published material on industrial land remediation and on soil contamination and its effects, including the effects on housing. This is not a conventional bibliography. Rather it has been selected to bring to the attention of researchers possible sources that may not normally be cited. A much more comprehensive and wide ranging bibliography including a media review has been prepared as part of this study by 11 Corinfo of North Bay. This extensive, two volume bibliography has been deposited with CMHC. ायः दः

CURRENT ACTIVITY IN THE FIELD: A STATUS REPORT

Many Canadian agencies and individuals are involved in the contaminated sites issue as it affects housing. They include: government agencies; special purpose bodies; private sector associations; developers (private and public); and, environment and citizen groups. Activity is especially evident in those jurisdictions where redevelopment pressures for industrial sites is present. This section is an outline of the work being carried out by various agencies with an interest in soil remediation.

1) NATIONALLY FOCUSED ACTIVITY

Canadian Council of Ministers of the Environment

The CCME is a joint federal-provincial body that attempts to coordinate environmental protection activities. CCME's focus is on two main aspects of the contaminated soil issue: standard setting and resolution of liability matters. In 1991 CCME released an interim set of environmental quality criteria for contaminated sites under the auspices of The National Contaminated Sites Remediation Program. These interim criteria adopted existing criteria for soil and water that are used by various jurisdictions in Canada.

Many of the criteria for soil are not supported by complete scientific rationale. In order to rectify this, CCME struck a sub-committee to derive criteria through a rigorous scientific process. CCME's Subcommittee for Environmental Quality Criteria for Contaminated Sites, following considerable research, has drafted a protocol for the development of soil remediation guidelines. This draft is currently being reviewed internally and will be available for public comment in early 1994. The final protocol will be used to develop soil remediation standards for approximately five contaminants per year.

The protocol proposes a three step process to derive soil quality criteria. This process includes: the assessment of the risk posed by a chemical, the determination of the estimated daily intake of the chemical ("background exposure"), determination of on-site exposure.

The resulting soil criteria must ensure that exposure presents only negligible risks. Risks are to be based on two effects - human health effects and ecological effects. The lower of the two will be used to determine the soil quality criterion for each land use.

The consultants are not in a position to review the scientific methodology of this criteria derivation process but a thorough review from a housing and other perspectives is warranted. At the time of writing, the CCME document has not been circulated for comment to the groups with which the consultant has been in contact.

There is little evidence of the protocol addressing economic or social concerns, although the terms of reference for CCME require that economic considerations be included. Similarly the relationship between soil quality and other issues such as housing are not explicitly acknowledged. Few housing, commercial development industry, and strategic urban planning representatives sat on the committee which drafted this protocol. There is little apparent consideration in the paper of commercial viability or contact mitigation; subjects which must be addressed if any actual remediation is to occur. Further, some of the underlying assumptions need examination from a broader perspective than that represented

on the committee: for example in Section 4.3.3 and again in Appendix 7 the paper makes sweeping assumptions about soil contamination migration from industrial to residential sites without evidence offered to support those assumptions.

The reader is left with the impression that the protocol fully recognizes the need to protect human and biological health.

However, there appears to be little recognition of other societal goals which must be met and which current approaches to soil contamination can fundamentally damage. These include affordable accessible housing, reduced urban sprawl and auto use, urban poverty reduction, investment stimulation and fiscal probity.

The CCME has also created the Task Group on Contaminated Site Liability. The pressure for creating this task group came from two sources. First, the provincial ministries of environment continually encountered this issue with their remediation projects. The second source of pressure came from business interests, particularly the banking industry, law associations, chemical producers, and petroleum producers. It became obvious to the CCME that these private and public interests could not resolve the issue and that some principles for liability were needed.

In March 1993 the CCME released a report that outlined thirteen principles to be followed in determining liability. These are as follows:

- 1. The principle of "polluter pays" should be paramount.
- 2. The principle of "fairness" should be applied in determining the extent to which certain parties are held liable.

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- 3. Site remediation should be a process that incorporates the principles of "openness, accessibility, and participation".
- 4. The beneficiary of a remediation project should be expected to contribute according to the benefits accrued.
- Site remediation policy should integrate environmental, human health, and economic concerns.
 Lenders and developers should be exempt from personal liability in the case of pre-existing contamination.
- 7. Legislation should make it possible to recover public funds expended on remediation from those persons deemed to be responsible.
- 8. A site remediation process should attempt to avoid excessive litigation through the establishment of alternative dispute resolution procedures.
- 9. In the case where more than one liable person exists, factors should be in place in order to allocate liability (the report contains a list or recommended factors).
- 10. The report proposes a four-step dispute-resolution mechanism.
- 11. Governments need to clarify policies for designating contaminated sites.
- 12. A person who completes the cleanup of a contaminated site should receive a certificate of compliance and be exempt from any further liability.
- 13. Benchmark standards, that vary according to use, need to be developed. There should be full public input into the development of these standards.

The intent behind these principles is to create a level playing field for lenders and developers.

The National Contaminated Sites Remediation Program (NCSRP)

This program was established by Environment Canada in cooperation with CCME in 1989 to:

- identify and remediate high risk contaminated sites that threaten human health or the quality of the environment
- provide resources to deal with high risk "orphan" sites (ie sites without a responsible owner with adequate resources to deal with the contamination)
- work with private industry to develop new site remediation technologies in Canada coordinate the CCME activities in terms of
 - i. a National classification system for contaminated sites
 - ii. interim Canadian environmental quality criteria for the assessment and remediation of soil and water on contaminated sites.

The program is delivered through a series of bilateral agreements between Environment Canada and Provincial and Territorial environment ministries, in a manner which seeks to reduce uncertainty and establishes common approaches. The, NCSRP attempts to play a catalytic role, developing standards and technologies in concert with government and interest groups, and establishing field demonstrations with businesses of environmental technologies. The program has had less success than hoped for with business and is now working with Canadian municipalities on environmental demonstration projects.

The Canadian Standards Association (CSA)

CSA is active in developing a series of guidelines and standards in the environmental field. Under their Environmental Management Systems Program they are developing a series of environmental management tools for industry to use voluntarily. They are in the process of establishing consensus standards on such topics as risk evaluation, environmental audit, life cycle planning, and environmental labelling.

Two of their draft documents are of particular interest. The first deals with principles of environmental audit, which will set out a standard practice for undertaking audits for a variety of environmental risks including site contamination. The second document which is applicable to this paper is the draft standard for a Phase 1 Environmental Site Assessment. It defines the three components of a phase 1 assessment.

Canada Mortgage and Housing Corporation (CMHC)

CMHC is involved in the issue of urban soil contamination in three ways, each of which is associated with its major roles as the federal housing agency. Firstly, CMHC is interested in the issue of contaminated land as a provider of social housing assistance. Social housing projects have often been built in urban core areas and as such, have served as an agent of urban revitalization. Although it is only rarely a landlord, CMHC nevertheless has an interest in ensuring that tenants in social housing are not exposed to harmful contaminants. CMHC is also concerned that remediation requirements,

while ensuring occupant safety, do not unnecessarily add costs which become barriers to providing affordable housing in urban areas.

CMHC's second area of interest relates to research and information transfer. In order to be able to respond to public concerns over environmental hazards, CMHC is conducting research to acquire the knowledge and tools required to detect and remediate contaminated property. This will provide CMHC with the means to evaluate the hazards to those living in houses sited on or near contaminated lands, and to offer them advice on remedial measures.

Thirdly, CMHC is interested in issues related to contaminated lands as an insurer of mortgage loans on residential dwellings. CMHC subscribes to the principles of sustainable development and in this regard, CMHC is a major advocate of residential intensification. As a mortgage insurer, CMHC is facing difficult trade-offs between facilitating residential development in areas where land may be contaminated and protecting the Mortgage Insurance Fund from unacceptable environmental risks.

Canadian Bankers Association (CBA)

The banking and development industries have differing perspective on soil contamination issues. The developers want an efficient and cost-effective process to allow for the expedient development. (See discussion under Canadian Homebuilders Association). The bankers' main concern is that of liability.

The CBA has established an Environmental Risk Task Force and has been involved in various government and non-governmental organization committees, including the CCME's Task Groups on Contaminated Site Liability. It has also published several documents on the issue. The Association has developed seven recommendations as to how to ensure a supply of capital for redevelopment of contaminated sites:

- 1. Liability should be based on "polluter pays" and rest squarely on those who actually cause pollution or who negligently permit it to continue.
- 2. It should be recognized that lenders are not polluters and, consequently, there should be limited lender liability.
- 3. In relation to limited lender liability, those exercising due diligence should be afforded a defence to the liability.
- 4. There should be a statutory obligation on borrowers and vendors to disclose to lenders and purchasers pertinent information about the possible contamination of sites.
- 5. Environmental liability should not be imposed retroactively unless a former owner has violated the environmental laws then applicable to it.
- 6. Persons responsible for pollution should contribute to the costs of cleanup in proportion to their responsibility for the pollution.
- 7. The federal and provincial governments should take a leadership role in developing standards for the preparation of site assessments and the certification of qualified site auditors.

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Canadian Urban Institute (CUI)

The Canadian Urban Institute is a non-profit organization whose mandate includes helping municipalities in Canada develop better urban management techniques. While the Institute became involved in the issue of soil remediation through funding provided by the Ontario Ministry of Housing and workshops it has conducted with The Toronto Waterfront Trust, its work applies and is available to municipalities across the country.

One of the problems with site remediation is the limited information on contaminated site location as well as each site's contaminant content and make-up. While several municipalities have begun to compile listings of contaminated sites, the most extensive inventories have been created by the Niagara Region and the City of Toronto. These inventories include data on existing developable land within the municipalities, listings of contaminated sites, and details of the possible contaminants that may exist on particular sites. Based on this experience and further research conducted by the CUI, it is preparing a manual for municipalities across the country on the preparation of contaminated site inventories. The Institute feels that it is important to establish a database of contaminated sites so that stakeholders have a better idea of the scope and scale of the problem.

Significantly, The Ontario Ministry of Housing is funding this CUI project because the Ministry believes that soil contamination is hindering housing intensification. The Ministry's reasoning is that intensification will not take place if municipalities and other stakeholders become embroiled in a long and complicated process for soil remediation. The inventories created by municipalities will also serve as a database of potential sites for intensification and reurbanization.

Canadian Home Builders Association (CHBA)

The CHBA views the issue of soil contamination as a road block to the redevelopment of urban lands for housing. Additionally, they want to minimize costs and maintain an acceptable profit level for developers. CHBA released a discussion paper in mid-1993 that outlined the housing industry's perspective on contaminated lands.

Concerns of CHBA include:

- Fairness that liability be apportioned fairly and that those held responsible for remediating sites be treated equitably.
- Realism that requirements for site remediation be based on demonstratable risk and not on theory.
- Practicality that the most cost effective processes that would adequately address real risk be permitted.
- Appropriateness that standards should reflect differing risks associated with different land uses and different site capacities for engineered solutions.

The Association proposes the following principles and suggestions:

- Liability should be limited for those who have exercised due diligence.
- In terms of the principle "beneficiary pays", "beneficiary" should include the benefit of jobs and income that result from a remediation project.

- Any process that is developed should be practical and cost-effective.
- Clean-up policies should reflect varying site sizes and contamination risk levels. There is a need to determine these risk levels and then apply assessment criteria that reflect those.
- The establishing of clean-up criteria should be done on a national basis, with the inclusion of all stakeholders (similar to the process for the National Building Code).
- Alternatives to disposal and cleanup should be investigated.
- The CSA's environmental auditing principles and practices should be applied.

The concerns of the CHBA add an additional dimension to reurbanization. The Association believes that remediation should not only make it possible for governments to provide housing opportunities, but it should encourage private developers to invest in reurbanizing these lands.

Canadian Environmental Law Association (CELA)

CELA expresses an interest in several legal and regulatory issues of contaminated site liability. It acts as an extensive resource canter and expects to have an impact on future remediation projects. Its activities are case by case as well as through submission of suggestions to government and participation on committees struck by Governments

CELA feels that Canadian law on contamination liability is unclear, based on cases such as the 1990 Northern Wood Preservers case in Ontario. According to CELA, this case raises a number of important issues, including the paradox of ownership of a contaminated area but not the actual contaminant, and the possible need for those providing mortgages to police the activities of their borrowers.

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Most Provinces are content to deal with soil contamination through National programs and cite in particular the work of Canadian Council of Ministers of the Environment and the National Contaminated Sites Remediation Program. In these cases, issues have not arisen that occasioned sufficient concern to push soil contamination onto the Provincial political agenda. Below, the activity of the Province of Manitoba is described. With minor variations, it is believed that all but three Provinces approach the issue in this way. However, the issues are evolving quickly in this field and it is possible that some Provincial activity that has not come to the attention of the consultant is now underway.

In three provinces, the issue of urban soil contamination and its impact on redevelopment have warranted Provincial attention. in these cases Provincial activity is underway that is supplementary to the National activity. As will be seen in the following discussion, not all activity is consistent with the National direction.

Manitoba, Ministry of the Environment

Site remediation in Manitoba, as in most parts of the country is regulated by the provincial Ministry of the Environment. Municipalities ensure that development projects are consistent with provincial policies but do not place additional constraints on developers.

The Ministry of the Environment has three methods for detecting contaminated sites. The first of these, as is the case throughout the country, involves the decommissioning and redevelopment of lands. As part of the decommissioning process a site must be tested for various contaminants. A second method is through citizen response to contamination. In other words, if contamination has filtered off-site to other properties and is detected, the Province attempts to determine the source of the contamination.

The third method for detecting contaminated sites is related to petroleum handling and storage. Any site that stores gasoline, including a gas station, is required by law to keep an inventory. As soon as there exists a 10% discrepancy in that inventory, the owner is required to report it to the Ministry of the Environment at which time site testing will occur. This method has been successful in determining a number of contaminated urban sites.

In terms of criteria, the province has not established their own. They are currently using the CCME interim criteria and plan to adopt their new guidelines when issued.

Nova Scotia, Ministry of the Environment

The province of Nova Scotia is currently in the process of redrafting legislation regarding site remediation and it hopes to have new policies in place by 1995. Much of the reason for redrafting legislation has to do with the fact that its current process has developed over time through the existence of both formal laws and informal practices.

Currently, the site remediation process in Nova Scotia requires that the owner of any contaminated site

be responsible for the cleanup of that site. The province however, has attempted to make previous owners (where it is known that they caused the pollution) pay for the site remediation. There are many legal problems entangled within this liability issue and, therefore, the new legislation will attempt to clearly set out who must take responsibility in remediating contaminated soils.

There are two main ways in which the province becomes aware of contaminated sites. The first is through the redevelopment of land, where the land owner must ensure that a new development meets specified environmental criteria.

The second, and increasingly more common, method for detecting contaminated sites is when lenders contact the Ministry to investigate the environmental risks associated with a particular mortgagor. In such a situation, the province may issue a Ministerial Control Order that requires the site to be remediated. The problem with this process is that as Control Orders are issued, the lenders tend to restrict loans which, in turn, limits the supply of money a land owner has to cleanup their site.

The Province has not yet established any independent standards for soil quality. Its basic standard is the interim criteria provided by the CCME. However, Nova Scotia allows for a case-by-case analysis of site-specific risks and where a land owner proposes an alternative to CCME guidelines, it will evaluate the proposal on the basis of risk. In this case there may be no reference to CCME criteria.

In the future, the Province intends to adopt standards set by the CCME and intends to continue its case by case alternative process.

It should be noted that British Columbia and other Provinces also permit case by case variations where circumstances warrant but in those cases the local variations are seen as exceptions and not a parallel system to be used at the discretion of the landowner.

At the municipal level there do not exist any further policies. Site remediation remains a provincial concern and the only policies municipalities have adopted require that any new developments meet Provincial requirements.

Ontario, Ministry of Environment and Energy (MOEE)

The Ontario Ministry of Environment and Energy, like other provincial ministries of environment, oversees the process of site remediation and decommissioning. There is no legislation to control the remediation process.

Instead, the province has drafted decommissioning guidelines containing recommended standards for 22 contaminants. While the guidelines are not legislated, they are regarded as regulations by most stakeholders. If landowners, however, wish to be exempt from those guidelines, they are able to determine their own standards, if they can demonstrate the scientific validity of their process.

These guidelines were put in place as recently as 1989, but the ministry is now reviewing the entire decommissioning process due to perceived inadequacies of the current process. A new draft guideline has been proposed by the ministry but not yet adopted. While this report has not analyzed the new approach, it represents a fundamental move away from the current guideline and appears similar in intent to the proposed approach for CCME. It utilizes generic criteria rather then substance by

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substance criteria, recognizes the issue of depth of clean-up and is based on different standards for different proposed usages. It is not clear whether the differences among the usage standards are based on real risk, assumed risk or conventional wisdom. Also, it is not known at the time of writing if the risk assessment measures proposed for the new guidelines are based on economic, and social criteria or exclusively on environmental criteria. The outline released to date suggests that the objectives are strictly environmental, but further examination of this proposed direction is warranted.

The lack of a legislative framework is an acknowledged problem as it reduces site remediation to the point where it becomes a bargaining process between the owners of land under question and the various government agencies involved. The MOEE is also looking at how to distribute liability among the various stakeholders. The Ontario Government is reviewing the detailed environmental assessment procedures of both the CMHC interim procedure and the CSA process. Finally, the Province is preparing a "statement of environmental values" as part of the Province's plan to introduce an Environmental Bill of Rights. This may further affect the soil contamination issue.

Ontario, Ministry of Housing

The Ontario Ministry of Housing has been particularly affected by soil contamination issues. In 1992 soil contamination was a major factor in the cancellation of one of the ministry's biggest intensification and affordable housing projects, "Ataratiri" in Toronto's Port Industrial District.

The Ontario Ministry of Housing has been active in operational and policy activities. From an operational perspective, four issues stand out:

- 1. Definition of legal and liability concerns.
- 2. The appropriateness of CMHC' referenced requirements for soil quality.
- 3. Financing and refinancing if the terms of the mortgage change; CMHC now requires an environmental assessment.
- 4. Meeting intensification objectives. The Ministry of Housing does not have the finances to pay for site clean-ups and this is beginning to jeopardize its intensification goals which apply throughout urban Ontario.

Additionally, the two Ontario ministries are developing an environmental liability action plan and are revising the Province's Decommissioning Guidelines.

Quebec, Ministry of Environment

In early 1988, the Quebec Ministry of the Environment released its "Contaminated Sites Rehabilitation Policy". This broad policy was based on the following four premises.

1. It is desirable from an environmental standpoint to recover former industrial lots which contain contaminated soil. The premise suggests that the setting of standards without achieving actual remediation is insufficient. (This distinguishes Quebec's approach from the others).

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Merely defining a site as contaminated and leaving it fallow [as Ontario has done with Ataratiri] is "out of step ... with current trends in post-industrial societies, where emphasis is placed on the maximization of urban potential, the recovery and redevelopment of old buildings, the return of residents to the city centres and the creation of new living areas and parks in the heart of former industrial zones. ...The return of a proportion of suburban populations to city centres [exploits] the ideal location of lots and their low cost [which] makes them attractive to potential developers".

The site rehabilitation process is driven by the demands of the public but especially by the demands of the development and real estate sectors. (This also distinguishes it from other approaches).

Municipalities must possess a thorough inventory of contaminated sites, so that they can ascertain the levels of contamination caused by previous activity.

Contaminated land must be properly managed using specific procedures and criteria. The Ministry has developed a "Standard Guide to the Characterization of Contaminated Sites" which assists in evaluating the levels of contamination and the degree of rehabilitation required before the land can be used. These soil and groundwater criteria were developed in conjunction with industrialized nations. The use of these criteria, combined with the individual hydrogeological soil properties, the contaminants dispersal area, the ecotoxilogical properties of the substances in question and the planned land use suggest the degree and type of decontamination.

Quebec's site rehabilitation policy has been developed with these premises in mind and focuses on three objectives:

a. Prevent uses of contaminated land which are a detriment to health, the environment and the property, primarily by increasing the awareness of municipalities, landowners, other Provincial departments and all other concerned parties.

b. Promote the recovery of land resources, provided that the decontamination is compatible with the end use and is safe for users and the environment.

c. Ensure that contaminated soil is handled safely through;

- site specific procedures,
- quality criteria guidelines for each method of site rehabilitation,
- appropriate treatment technologies or containment/burial measures,
- staff training.

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3) LOCALLY FOCUSED ACTIVITY

Most municipalities in Canada have a minimal role in soil contamination policy. The role they do perform is in response to a specific problem or complaint. Typically municipal activity is in response to an application for re-development of a site and consists of applying a National or provincial guideline without independently assessing the standards used.

Another general experience of municipalities is with municipal enterprises themselves being affected by soil contamination. In these latter instances, the municipality is involved as any other developer might confront the issue. This report therefore, does not dwell on the concerns of Canadian municipalities except where the activity they have undertaken represents a significant contribution to the activity on soil contamination as it affects housing.

In addition to those few municipal activities in the field there are one or two other local activities of note.

Not surprisingly the communities with unique experiences in confronting the challenge of soil contamination that came to the attention of the consultant, are the three largest urban areas in the country. The activity in Toronto is intense and extensive and much of the discussion of local activity of necessity focuses there. In Vancouver, there is one interesting departure. In Montreal, the issue of most interest is the degree to which the problem is not a problem.

Montreal

The City of Montreal is one of the few local jurisdictions that operated even slightly separately from Provincial and national systems. While privately owned lands come under the Quebec system described above, the City utilizes a protocol of its own for lands owned by the City. This does not appear to have been as a result of any particularly determined policy decision or concern with the Quebec process. It appears to have been considered administratively appropriate and was thus implemented. The protocol used by the city in any event, appears to be comparable to the Provincial policy. The issue is not considered to be particularly important either environmentally or economically in Montreal.

Toronto Harbour

A great amount of soil remediation activity is occurring in the Toronto harbour's Port Industrial District. There are a number of reasons for this; the city has a large number of industrial sites, many of Toronto's industrial lands are in public ownership (thereby demanding government management), a provincial planning exercise for Toronto's waterfront means that the local provincial and federal governments have had to address contaminated soil issues. Three local public agencies on Toronto's waterfront are working on both policy and implementation aspects of soil contamination: the Waterfront Regeneration Trust, the Toronto Harbour Commission, and the Toronto Economic Development Corporation.

Waterfront Regeneration Trust

The Waterfront Regeneration Trust has a mandate to investigate the future of the waterfront from Burlington to Oshawa and to ensure the enhancement public enjoyment of these lands. One of the Trust's working groups is looking at the issue of soil contamination and site remediation. This site remediation working group is studying the Lower Don Lands, an area containing several hundred hectares of under used post-industrial land. The working group was divided into three sub-groups focusing on:

- Approaches to site clean-up.
- Environmental liability and economic considerations.
- Technologies and information.

It is hoped that a set of general strategies, or a site remediation model can be developed from this process. This model could then be used by the province to help create a new process for site remediation, one that improves upon the current decommissioning guidelines.

Toronto Harbour Commission (THC)

The Toronto Harbour Commission, is a major land-owner in the Port Industrial District, and is responsible for a large proportion of the city's old industrial sites that sit on contaminated land. In 1991 the THC built an on-site soil recycling facility to regenerate and thereby add value to its lands. A final report on this project will be issued shortly. The THC is frustrated that few government agencies are paying attention to its project or considering it as model for soil remediation.

Harbour Commission officials have identified three main challenges

- Lenders are worried about consistency of the regulations and standards and thus are concerned about unexpected costs and liabilities. As a result, lenders are staying clear from any land containing contaminants. Even where clean-up costs are now economically practical, they are concerned that the situation will not hold. What they want is some consistency and permanency in the definition of adequate environmental quality.
- There is little cooperation among stakeholders. In order for soil clean-up to be financially feasible, a large volume of material is required in order to lower the unit cost. A single land owner or developer may not own enough land to pay for soil remediation technologies, such as soil recycling. Acting together, however, investments in new technologies will be financially possible. Currently, such cooperation does not exist.
 - Few stakeholders are willing to invest in soil remediation. Much of the land in question is publicly owned and the public agencies responsible for this land are either financially incapable of, or politically disinterested in, finding solutions. The private sector is also not willing to clean-up soil because clean-up costs are generally seen to be so extreme as to eliminate any potential use for which there would otherwise be a market (eg. housing). It is less expensive to pay taxes on idle land than to undertake a soil remediation exercise and develop the land.

Toronto Economic Development Corporation (TEDCO)

The Toronto Economic Development Corporation, is a municipally owned development company whose specific mandate is to attract "green" and advanced technology industries to old industrial sites such as Toronto's Port Industrial District.

Its interest in soil remediation is its impact on the agency's role as a catalyst for adding value to the Toronto economy.

TEDCO has conducted diagnostic soil testing on many industrial sites. It has also consulted with the private sector on a three-step model for site remediation:

- All soils under the future building footprint are cleaned, regardless of depth. This is done to ensure that the structures in which people will be working are built on clean land.
- The remainder of the soil around the building footprint is left as is. As an alternative to expensive remediation techniques, TEDCO proposes to pave this area. The paving would be a temporary measure until the technology reaches a point where it becomes economically feasible to clean up the soil and use it for other purposes.
- The first two steps are conducted on site-by-site basis. The final step involves an area-wide analysis of ground water contamination, in conjunction with government officials.

This model assumes an industrial land use. At the present time the city is not prepared to consider housing on these lands. It believes that the lands can be economically useful as employment lands. If circumstances change, other land uses would be considered. In the meantime, however, the THC believes that it is important to clean up the port lands and ready them for industrial uses rather than leaving the sites idle.

Vancouver

Vancouver has been actively pursuing reurbanization to a much greater extent than Toronto, where soil quality concerns and a political debate over landuse has stopped what post-industrial redevelopment might have escaped the recession.

The recession has not impacted on Vancouver to the extent that it has in other parts of the country and as a result it has experienced a relatively greater amount of development. Waterfront lands have been particularly attractive for reurbanization. Many of these lands were previously occupied by industry.

There is a local perception that there is difference between industrial sites in Vancouver and those in central Canada, in that the former involved resource extraction. Older industrial sites in Vancouver were normally engaged in shipping timber and other forestry products, as opposed to being used for manufacturing. Although no evidence is available to support the contention, it is widely believed that these sites are therefore, less contaminated. The pollution problem in British Columbia, therefore, is defined as the dumping of effluent into waterways, not soil contamination. This is not to say that there is not a problem in B.C., but that traditional environmental thinking has not placed importance on contaminated soils.

There are of course, known and acknowledged problem areas and here (eg False Creek and Victoria Harbour) the debate about the utility of remediation has been as heavily contested as in other parts of the country. In particular, public health officials are questioning the priority given to contaminated soils. From their perspective there are a great many risks in society that are more threatening to the environment and human health. They object to the allocation of large amounts of public and private funds to low, rather than high risks.

Agencies such as the Greater Vancouver Regional District (GVRD), have not had to study or contend with the issue of soil remediation. The B.C. Ministry of the Environment is currently working together with the CCME and Environment Canada on creating a new set of standards as well as a comprehensive process for dealing with redeveloping contaminated sites. The GVRD believes that the provincial policies will not interfere unduly with the redevelopment process.

The luxury enjoyed in Vancouver is that there has not been a stoppage to development due to soil concerns such as has occurred in Toronto. As a result, soil contamination is not perceived as a threat to economic development.
SUMMARY OF STATUS REPORT

The issue of contaminated soils as it relates to housing is being dealt with in a fragmented and unstructured manner. There is considerable coordination on the subjects that have preoccupied Governments, financial institutions and land owners: determining liability for contaminated sites and setting remediation standards. Yet even these are not addressed in an integrated manner but as discrete problems.

Beyond these narrow issues there is little coordinated activity. There exists little co-operation or sharing of information among the stakeholders representing differing perspectives.

There is no doubt that liability will remain a dominant concern as long as remediation is coupled with redevelopment. The dependence on standard setting is also understandable from the perspective of those whose interests is clarification of liability. The preoccupation with liability and standard setting, however, has led to other important factors, most notably risk assessment being overlooked.

Where there is an acknowledged concern about risk assessment, there is little evidence of an even handed effort to balance economic, social and environmental interests. The goal of setting standards is to reduce human and environmental risks at acceptable and reasonable economic and social costs. The agencies involved want a quick determination of standards but have not adequately determined the relationships among the various risks involved.

This status report, therefore, demonstrates two important characteristics of aspects of the soil remediation issue.

First, progress on the issue is being conducted in a fragmented and uncoordinated manner.

Second, the overwhelming preoccupation has been with liability and standards without sufficient regard to balancing the competing risks involved. The risk assessment processes being considered appear to examine environmental risk but do not include risks associated with economic, social community and fiscal factors.

With this understanding, it is now possible to review and analyze the major issues being raised.

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SECTION 3

ISSUES ARISING FROM SOIL CONTAMINATION AND HOUSING

The consultant interviewed a variety of people (see Appendix 2) from, among others, the development and financial services sector, industry interest groups, local and provincial governments, scientists and professionals and legal and residential communities. While these discussions were often wide ranging, the focus of the interviews was on the key issues in the area of soil contamination as it relates to housing. Perhaps because of the nature of the situation, the issues raised focused on policy matters, and specifically the policy issues raised by current approaches to soil contamination.

The issues raised suggest four classifications of policy issues:

- environmental;
- economic;
- social and community; and,
- fiscal.

ENVIRONMENTAL POLICY ISSUES

The response of governments to the new levels of environmental awareness has been to analyze their systems and procedures to ensure that they are contributing to a sustainable future -- one in which one generation's actions do not jeopardize the opportunities of another.

Yet a sustainable future cannot be achieved through a simple reversal of priorities, for example from economic to environmental priorities. It is folly to change direction without also changing the way things are done. Instead governments that wish to emphasize environmental priorities must integrate them with economic priorities if there is to be hope of a sustainable future.

Equally, the definition of environmental issues must be broad enough to constitute not just a review of environmental damage, but also the environmental opportunity cost of a given action.

RESISTING SPRAWL

In this context, the environmental potential of former industrial sites is one of the key policy issues raised frequently during the interviews conducted for this report. Urban sprawl is a cancer which eats away at the urban centres of the world. The physical environmental effects of sprawl are documented in terms of the consumption of arable land, contribution to various forms of pollution, and excess consumption of energy. Sprawl also has a deleterious effect on the social environment through the alienation of communities and the expansion of commuting times, among other effects. Even where sprawl has been organized in satellite communities, developed in an effort to overcome this latter liability, very little success has been reported in North America or Europe. Evidence to suggest that the environmental costs of sprawl far outweigh the environmental risk of re-use of the lands at issue was cited by several of the interest groups interviewed.

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Vacant, and often contaminated, industrial lands represent the principal opportunity to marshall urban resources in the interest of reducing sprawl. This suggests a strident warning to regulators and policy creators.

Regulatory processes that fail to recognize the potential environmental benefits of liveable urban centres -- and therefore the re-use of already urbanized lands -- may actually exacerbate the environmental problem of urban sprawl by making redevelopment too expensive and too risky.

DEVELOPMENT APPLICATIONS TRIGGER THE PROCESS

Another environmental issue suggests a curious irony. The current procedures for assessing and cleaning up contaminated soil are typically triggered by a redevelopment application. Without such a development signal, the contamination does not exist officially in the eyes of the regulatory and policy formation bodies. This is so even if the site is obvious in its potential for contamination and nothing in the way of assessment, clean up or redevelopment is started.

Yet investors are shy about any redevelopment of potentially contaminated sites because of the complexity and cost of clean up. In fact, as discussed in the previous point, an effect of the contamination regulatory process has been to drive up the risk of downtown re-development in many large areas, forcing development to the only other available lands - greenfields at the fringe of the suburbs.

Because investors are avoiding potentially contaminated sites in urban areas, with an according decline in redevelopment applications, the ironic effect is that pollution hazards may go undetected and/or uncorrected for the foreseeable future. From this perspective, neither potential public health concerns, nor the potential for redevelopment are met; instead a stasis prevails.

STANDARDS AND RISK

Another environmental policy issue centres on the assertion by several of the interests contacted that treatment of soils may result in little or no reduction in risks to health or the ecosystem. Current regulatory processes do not respond to issues according to the risk they represent to the public.

Risk is a function of three variables - toxicity, concentration, and probability of exposure. The difficulty in assessing risk lies in the fact that current regulatory practices do not adequately distinguish between hazards and benign materials, nor do they distinguish between concentrations of materials that might be hazardous and concentrations that are effectively harmless. According to public health professionals in two provinces, whether a site is remediated is independent of a) the presence of toxins b) the concentration of toxins, and c) the risk of exposure of toxins to the environment and humans.

While the CCME has created a set of interim quality criteria, there still does not exist a set of nationally-applicable standards for remediating soils. Instead, provincial guidelines prevail, mainly in the area of contaminated site decommissioning. These guidelines not only vary among provinces, but are also inconsistent in terms of the number of contaminants they include. The province of Ontario currently has the most substantial list, at twenty-two.

While CCME is attempting to create a consistent set of national guidelines, the process of setting standards, however, is a slow one and it will take at least a decade before a full set of national standards can be in place.

But regardless of procedural difficulties, the central issue is that there is little data to prove or disprove possible health risk. According to one senior provincial official, setting arbitrary standards, no matter how high or low, may do little to reduce health risk because we are unaware of the long term effects of contaminants. Even the respected U.S. Agency for Toxic Substances and Disease Registry acknowledges that "a definitive analysis of the impact on public health of [contaminated] soil is often limited by a lack of information on human exposure factors and soil conditions".

As well, the correlation between health and contamination is affected by dozens of variables including access to soil, behaviour patterns, presence of ground cover, seasonal variation of exposure conditions, particle size and the composition of the on-site compounds, and the exposure pathway. These complex factors go some way to explaining the discrepancies in health risk assessment.

As mentioned earlier, public health officials have been concerned with this discrepancy. Dr. Blatherwick, the Chief Medical Officer of Health for Vancouver, is one of the principal critics of the present approach to soil risk. He indicated that even the most serious contaminants present on the infamous False Creek site would not represent a hazard to anyone unless they ate the soil regularly. Dr. Blatherwick also described the public and private expenditures being devoted to cleaning nonhazardous soils as "unrelated to risks to human health" and"irresponsible", given the very significant need to reduce much higher risks in other elements of community life. The example he proposed was the government's willingness to spend between \$50 and \$100 million to remediate soils at the False Creek site. He suggested that this expenditure would reduce the number of cancers in Vancouver by one person in one million over a lifetime. He pointed out that if the government were truly concerned with human health, it would be far better advised to spend \$55,000 per year to supply a traffic officer at a particularly dangerous road intersection, where one life could be saved in every 70,000 over a lifetime. In other words, society should not spend 10 times as much on soil remediation as on traffic safety to save one-tenth as many lives.

A variety of public health professionals, including Dr. Blatherwick, the medical officer of health in Sudbury, and the head of the Healthy Cities Office in Toronto, agree that there is a need for greater independent assessment of actual risks posed by contaminated sites. This risk assessment should be guided by the need to direct expenditures toward the areas of greatest risk, rather than the areas of greatest media interest.

THE FOCUS IS ON LIABILITY AVOIDANCE INSTEAD OF ENVIRONMENTAL RISKS

An emerging issue is that most public policy development and consultation now under way, including that sponsored by environmental ministries, focuses on liability avoidance and not on the safe re-use of contaminated lands.

As the status section noted, the issue of contaminated site liability has been a pressing concern for the CCME. Ministries of the environment are anxious to find a practical way to resolve the issue, at least in part to avoid any liability on them

The issue of contaminated site liability was also raised by a variety of representatives of the legal and financial communities. These groups thrive on predictability, and the potential for them to be saddled with unexpected liabilities gave impetus to the CCME work on liability.

The Canadian Banking Association is concerned about liability during the environmental assessment process. The CBA has received contradictory responses from various government and regulatory agencies as to whether site facilitators are deemed liable during phase 1 environmental assessments.

These liability issues are important, but their resolution does not resolve any soil contamination. Liability is a symptom of the contaminated soil problem, but not a cause in itself. When the issue of balanced, multi-factor risk assessment is dealt with, liability concerns will be much easier to resolve.

In short, liability is about self interest -- risk assessment is about public interest and there is a need to focus on the balance of public interests.

ECONOMIC POLICY ISSUES

In many ways the economic policy issues surrounding the contaminated soils and housing conundrum are linked to environmental issues. The old idea of separating the management of business from the management of our environments is no longer appropriate for a sustainable society. Still, there are some issues that are discretely economic policy issues, which are key to an understanding of the contaminated soils problem.

THE STERILIZATION OF A KEY ECONOMIC RESOURCE

Thousands of hectares of downtown Canada are or will soon be virtually unusable for any economically viable purpose because of the confusion and uncontrolled risk involving soil contamination. Current practice has economically sterilized key public and private resources worth billions, and has effectively prevented re-useable downtown lands from contributing to new employment.

The economic restructuring of the last few years which has propelled us through painful and extensive change has produced dramatic evidence of new economic realities. Hundreds of downtown industries closed or moved. Thousands of industrial workers were displaced and serious concerns about their economic future remain unanswered.

Almost lost in these immediate issues was the change in the physical use of our downtowns. Where large bustling industrial areas had been, now stand empty parking lots and padlocked old buildings. Thousands of hectares of downtown rail yards fell silent and grow rust and weeds. Port lands that had hummed with the business of trans-shipment have become fallow storage areas. Former freight forwarding facilities now serve as truck storage facilities and real estate signs advertising available industrial space have grown faded with age. From coast to coast to coast this is the Canadian reality.

Frustrating the efforts to find a new role for downtown post-industrial lands has been the rising awareness that these lands may be contaminated with the by-products and waste of a century or more of industrial production.

The opportunity to re-develop downtown lands is a potential job creator of considerable significance. Re-urbanisation is labour intensive and utilizes workers from industries that are experiencing high unemployment rates. These are not jobs that will be available in the suburbs if the downtown lands remain fallow. Considerable academic evidence suggests (see Porter, Howell and Neil in particular) that cities are competing with each other for inner city development to a greater extent than they are competing with their hinterland. More economically responsible soil regulations are seen as removing an obstacle to downtown job creation.

THE COSTS OF REMEDIATION

Many of the procedures for remediation that are often demanded by regulatory agencies are widely regarded as inefficient, expensive and hindrances to redevelopment. In particular the requirement to treat harmless substances as hazardous waste is seen as uneconomic.

Development costs have soared because of the approaches to contaminated lands. For example, one effect of the liability debate has been to force some major developers of downtown sites to create a reserve fund to insulate the developer against possible contamination problems in the future. This is not a legislative requirement by any means, but is emblematic of the effect of the liability avoidance exercises being led by CCME and others. The net result of this need to create a contamination "nest egg" is that investment capital is withheld from other projects, and that other developers become even more wary about the redevelopment of downtown sites.

One developer estimates that one of his major projects, a mixed use residential development on a large former industrial site, would cost 30 to 40% more today than it did five years ago because of increased process complexities and clean up costs. These costs directly affect the marketing of the property.

While treatment of real hazards is not questioned, some of the highest costs of development on old industrial lands stem from the allegedly hazardous items and soils discovered on site. One developer unearthed old industrial light ballasts covered with a light coating of PCB's, which were therefore considered hazardous. Since no hazardous waste facility would accept these ballasts, the developer was forced to build an on-site containment building, thereby reducing the amounts of both open space and developable land and increasing costs. This was despite the fact that, unless they are burned, PCB's are not considered to be dangerous to human health.

The costs can be even greater for hauling hazardous goods to a licensed disposal site. The limited number of provincially approved hazardous waste facilities, coupled with increased demand for such specialized services, result in substantial tipping fees which are added to development costs.

COMPLEX AND CONFUSING PROTOCOLS

The increased complexity of the approaches to contaminated soil also adds cost and confusion. One provincial official noted that CMHC regularly releases new criteria or amendments to existing criteria. Others suggest that they have to deal with 60-100 parameters associated with soil quality evaluation generated by CCME or provincial ministries of the environment. Even the smallest developer must hire specialized consultants who are up to date with the changing protocols and standards.

As well some financial stakeholders are complicating their own procedures just to keep up with government regulators and policy makers. The Mortgage Insurance Company of Canada, which currently has no requirement for an environmental site assessment, is planning to introduce one -- despite the fact that the company feels that its existing procedures adequately insure against risk. The company's rationale for adding a protocol is that lenders like their procedures to be consistent, so they produce similar requirements to those of CMHC. Complexity, it seems, breeds complexity.

DEEP POCKETS

Underlying the debate on soil contamination, there is a debate on whether and how "deep pockets" can be induced to meet remediation costs. It was suggested that this is the explicit position of many environmentalists and some government policy staff -- that position equates the ability to pay with obligation to pay. The argument goes that banks, developers and other sources of capital have been privileged to accumulate surplus wealth from society, and are therefore expected to spend some of their money on environmental improvement. The CBA believes that this idea must be challenged otherwise capital will be redirected away from the redevelopment of contaminated sites and, thus, retard the economy and delay the cleanup process.

SOCIAL AND COMMUNITY POLICY ISSUES

DOWNTOWN HOUSING MEETS A DEMAND

Appendix 1 notes that changing demographics and economics are creating a demand for downtown housing, especially for Canada's aging population. This is an important finding, not only because it is contrary to the conventional wisdom of the development industry, but mostly because the assumptions that underlie it are exceedingly conservative. It seems probable that because of several government programs in force across Canada (particularly in Quebec, Ontario and B.C.) the demand will be greater than the study predicts.

It reveals a significant increase in demand for downtown housing in the next two decades. This follows almost three decades of declining demand for such housing. Given the significant stake that society has in encouraging downtown redevelopment, this finding should give new impetus to the

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effort to amend any regulatory mechanisms which discourage such a trend. It seems likely that current approaches to soil contamination may be one of those mechanisms which frustrate this potential demand.

INTENSIFICATION WORKS BETTER IN DOWNTOWNS

Urban intensification is rapidly becoming an accepted environmental goal by some government policy makers, for the reasons cited previously. Housing intensification is easier to create in downtown areas than in suburban and established communities. From a design and architectural perspective, it is easier to create an integrated, intensive plan on a vacant downtown site, with access to existing high quality infrastructure than on a greenfields site. Also, intensified areas generally allow for a better match with job opportunities (located in proximity to housing) and accessibility to quality community recreational, cultural, educational and business amenities.

DECAYING NEIGHBOURHOODS WANT REDEVELOPMENT

In the view of a Toronto facilitator, skilled in surveying the residents of downtown industrial areas, blue collar community residents generally know very little about the effects of contamination in their area; nor do they want to know the extent of local environmental problems. The facilitator suggests that many blue collar residents of suspected contaminated areas feel abandoned by most local and provincial governments which are resigned to these downtown areas becoming economic graveyards. The area residents surveyed noted that this was not at all what they wanted. Instead they hope that redevelopment will have a positive impact on the local residential climate by permitting greater densities and therefore creating demand for more and better quality local amenities, local businesses and municipal services.

The facilitator suggests that soil contamination is a middle-class issue: "middle class people seem relatively more articulate and knowledgeable about the problems of soil contamination, because they have less to lose". Hence one major effect of the current approaches to contaminated soils, is that they tend to relegate working class people to secondary or tertiary social positions by unfairly characterizing their neighbourhoods as unfit for human life. The key to addressing this situation is to amend the soil contamination practices in a manner which creates a climate for mixed use, intensified downtown development.

The residents surveyed appeared to recognize the acceptable risks and opportunity costs of urban life. One prominent ratepayer group leader said that she was more concerned about air pollution from a neighbouring expressway than she was about a neighbouring vacant industrial site. This being said, the orphan sites in the residents' vicinity are visually unpleasant, and in the short term they need to be cleaned up aesthetically. Residents also noted their worries about contaminant migration; most do not grow vegetables in their home gardens.

As one resident put it, "the contamination used to be contained within the buildings, but now with the derelict condition of the site, the contaminants can blow all over the neighbourhood". The underlying belief is that current practice forces sites to remain empty and these are often perceived by neighbours as potential dangers and as eye sores.

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FAULTY COMMUNICATION

The residents with whom the consultant spoke were all articulate leaders in ratepayer groups. Yet curiously, the information they had received about neighbourhood soil contamination came primarily from the press. They were aware of no health nor environmental studies outside of those cited by the media. This suggests an opportunity for better communication with area residents, to prevent the paranoia that stems from living in an allegedly contaminated area. It also suggests that people need to be informed realistically about the threats -- and especially the lack of threats -- to their health.

FISCAL POLICY ISSUES

FISCAL VALUE OF DOWNTOWN REDEVELOPMENT

One of the main arguments heard in favour of post-industrial land redevelopment is that downtown lands are fully serviced with urban infrastructure, while new suburban areas require public investment to build and maintain new and duplicate facilities. Equally, with urban centres facing serious fiscal challenges associated with eroding tax bases, downtown redevelopment represents a way to gain value from an under used urban resource.

Slowly and reluctantly urban politicians are coming to terms with the loss of the urban industrial base. Understandable but fruitless efforts to attract heavy industry back downtown are giving way to efforts to find a new economic base for hundreds of thousands of hectares of those lands that are already under-utilized or vacant or that soon will be. Current soil contamination practices are inhibiting the remediation of these important urban lands. As well, the public sector is the largest owner of downtown lands in many cities. But, the cost and liability facing them from the current process may be greater than the value of the sites themselves.

HOUSING AT MORE AFFORDABLE PRICES

The supply of low and moderate cost housing has recently depended heavily on public sector programs that are less and less affordable. Downtown sites are potentially a private sector source of affordable units if soil contamination issues can be resolved economically. This is the social aspect of the urban redevelopment equation, whose economic and environmental policy aspects were discussed earlier.

SUMMARY OF POLICY ISSUES

Four categories of policy issues arise from the relationship between housing and soil contamination.

The environmental policy issues focus on the need to marshall downtown lands in the interest of urban intensification and curbing the environmental damage of urban sprawl. There is a need to amend current soil contamination processes so that risk assessment is the main focus and not standard setting or liability avoidance.

The economic issues focus on the costs that stem from the current contamination practices. Thousands of hectares of downtown Canada are, or will soon be, virtually unusable for any economically viable purpose because of the confusion and uncontrolled risk involving soil contamination. Current practice has economically sterilized key public and private resources worth billions, and has effectively prevented re-useable downtown lands from contributing to new employment.

The social and community issues section suggests that there is a strong, future demand for downtown housing that has not existed for many years. The opportunity presented by this demand may be squandered because of current approaches to soil contamination. It also discusses how soil contamination approaches tend to exacerbate differences among social classes.

The prime fiscal issue is the relative financial benefit of redeveloping already serviced downtown sites versus developing sites in unserviced suburban areas. The supply of lower cost housing would also be assisted, provided the contaminated soils practises are amended.

SECTION 4

THE HOUSING AGENDA AND SOIL CONTAMINATION

There are a number of significant housing issues related to soil contamination. The purpose of this section is to outline those issues and discuss the implications of current practices on the opportunities to pursue housing policy objectives.

Public housing policy and administration in Canada, like many public issues, is shared among the Federal, Provincial and Municipal levels of Government. This section does not distinguish among them but assumes similar interests among housing providers. The discussion has been grouped into three sections:

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- 1. Operating Issues
- 2. Supply Issues

3. Financing Issues

THE OPERATION OF ASSISTED HOUSING

CMHC, its Provincial, municipal and native partners own and/or manage a great deal of housing in Canada. The housing ranges from isolated houses in the far north, through native communities, small towns and villages to concentrated high rise communities in large cities. Urban soil contamination is a factor that must be examined by these housing operators. As landlords and operators they confront the issue in at least three guises.

First, many areas of Canada feature naturally occurring contaminants that may represent risks to residents of ground oriented housing. The existence and risk associated with naturally occurring radon and methane (which have been documented) are examples of this form of contamination. This report does not delve into this issue, it is limited to the subject of urban post industrial contamination.

Nevertheless, it is an issue which requires research and management. Housing operators currently have little to guide them in managing these issues. In order to manage stock responsibly housing managers (private and public) require better data upon which to judge a) the existence of naturally occurring hazards, b) the risk associated with such hazards and c) best practices to deal with hazards.

Second, housing operators confront an issue when neighbouring sites are identified as containing hazardous materials. Sites with a common history and sharing common ground and/or surface water may well share similar contamination. Because current regulatory processes usually identify contamination only on sites under re-development, occupied sites are rarely the subject of enquiry. Thus, while housing near contaminated sites may well experience the same contamination, there is little likelihood of it being identified. Housing operators thus face an ethical issue which could be put this way:

"The present methods of identifying contamination do not measure risk, but might indicate risk to neighbouring residents. When is it appropriate to take steps to test for contaminants?"

This question is not easily answered, since the stakes associated with the answer are high. The discovery of even harmless contaminants may create fear and incite reactions from residents. It may render mortgages and insurance unobtainable and may lead to unaffordable increases in costs. On the other hand, any actual or perceived risk to residents' health must be acted on.

Unless the standards and risks associated with soil contamination can be made much clearer, this issue of reflected liability will become more onerous in years to come.

Third, once lands are suspected of contamination, any existing housing units on those lands will be dramatically affected. The practice of lending and mortgage insurance companies is to require what amounts to "a clean bill of soil health" before they will lend or in many cases renew lending on a unit or building. Any building unable to meet this standard will not be able to be financed or to have its mortgage insured. There is no evidence to suggest that these buildings represent a danger and considerable evidence to suggest that most in this situation will not be dangerous. Yet as long as the standards are based on the presence of contaminants rather than the risk presented by contaminants, this is a situation that will be faced by all housing operators.

These operating concerns raise many questions that at the moment have no definitive answers. The concerns raised above may be alleviated as the definition and implications of soil contamination become more thoroughly understood. The ethical and liability questions remain valid and deserve exploration.

HOUSING SUPPLY ISSUES

A) PUBLIC AND ASSISTED HOUSING

In one way or another Canada has had public housing policies since before Confederation. In recent decades Canadian housing policy has become complex and extensive as the housing needs in Canada have multiplied in complexity.

The issue of public housing supply is also complex. It is not sufficient for there simply to be enough housing in the country. The supply must reflect several characteristics in order for it to useful in achieving housing policy objectives. It must be:

- APPROPRIATE; that is, there must be a supply of housing that is suited to the needs of Canada's under-housed population.
- AVAILABLE it must be on the market and not simply underutilized (like many large houses).
- AFFORDABLE Canada's under-housed must be able to live in it without paying more than 30% of their income for it.
- ACCESSIBLE it must be where the under-housed need it.
- ADEQUATE it must be safe, secure and sufficiently large.

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Since the mid- 1950's the principal means employed by governments to meet this need was building housing directly or through non-profit partners. This is the most direct way of ensuring that the housing supplied met the complex characteristics required in various communities. By directly providing new housing, it could be precisely targeted to needs in the community.

The principal drawback of this approach to meeting Canadian housing supply needs is that of costs. It is a very expensive proposition and in major cities it has become prohibitively expensive. This combined with the Canadian public sector fiscal condition has resulted in a decline in the direct subsidy of new unit construction.

The critical question is, "Where will the future supply of Canadian housing for the under-housed come from?". While it is not the intent of this paper to answer this question, there is a compelling logic that links future low cost housing supply to the issue of soil contamination.

Downtown Canada is where the services, employment and social support services required by the under-housed is found. Downtown Canada has large tracts of publicly owned or influenced lands. Downtown Canada is where there is little resistance to combining market and moderate income housing (as opposed to suburban neighbourhoods). Thus downtown Canada is a place where new housing for the under-housed should be built.

Unfortunately, the large tracts of public land in downtown Canada are often former port or transportation lands or waterfill and with few exceptions are the lands most likely to be affected by soil contamination concerns. Present methods for remediating soil contamination make these lands prohibitively expensive to bring onto the market, even for high end housing. Accordingly, if downtown public lands are to be used to integrate low and moderate cost housing, fundamental changes in the way we deal with soil contamination are necessary.

B) MARKET HOUSING

The principal role played by Government in Canadian market housing has been to create conditions conducive to a healthy market. CMHC and Provincial housing ministries recognize the role and value of the Canadian housing marketplace and ensure that its interests are understood by Government. Programs designed to protect home buyers from unscrupulous practices, mortgage financing initiatives, taxation provisions, research and data production and insurance initiatives involving both public and private partners have originated from this activity.

There is at this time a major housing market emerging that would meet a number of important public policies. Downtown housing supports employment objectives, environmental objectives, agricultural objectives, transportation objectives, social objectives and other strategic urban objectives.

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From the late 1940's until recently, housing construction in the private market has been predominantly suburban. This has resulted in a massive sprawling of Canadian cities that has been a matter of significant public concern. It is not the purpose of this paper to advocate for a particular housing market, but simply to point out that most metropolitan cities and many Provinces have undertaken efforts to concentrate the growth of cities in denser pockets including in downtowns. Recent planning publications produced in Toronto, Montreal and Vancouver have made particularly compelling cases for re-urbanization. The housing interests in Canada have a role to play in this regard.

There is increasing evidence that the changing demography in urban Canada is accelerating the demand for the form of housing traditionally supplied downtown. An economic review of this issue was undertaken for this report. The report of the study by Strategic Projections Inc. entitled "The Potential Demand For Dwelling Units In the Urban Core" is attached to this report as Appendix 1.

The study's conclusion are based on Toronto area data and the authors are of the opinion that "the conclusions derived from this analysis could be applied to any major urban area in Canada". The principal conclusion of the study is:

"Based on this evaluation it can be concluded, therefore, that because of:

- the changing age structure of Canada's population over the next 20 years,
- the relative attractiveness of major urban centres for new population growth, and

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the proclivity of a significant proportion of householders over 45 years of age to seek accommodation in other than single detached units,

urban planners would be well advised to find ways to facilitate the creation of higher density accommodation within the urban core areas of such centres.

The results here suggest there will be overwhelming demand for such units within the metropolitan environment and - if such units could be offered in the urban core at competitive prices - the potential for core densification, therefore, would be significant."

The caveat in this conclusion is the issue to which housing interests in Canada should direct their attentions. Whether such units can be offered at competitive prices is largely dependent on whether a better way of regulating soil in re-urbanized lands can be found.

In most respects downtowns are more competitive sites for denser housing than greenfield sites. There is less community resistance, the infrastructure cost and resulting levies are much lower, the associated lifestyle costs are often lower because of reduced commuting and increasingly (because of suburban land demands) the gross land price is comparable.

In one key respect downtown sites are constrained in a way that greenfield sites are not. They are invariably sites that have been used previously for urban purposes. No land developer nor builder is likely to invest in such lands for housing or any other purpose as long as the risk of soil contamination is as uncontrolled as it now is.

A second important issue related to supply has been referred to elsewhere in the report. In the absence of perfect knowledge of contaminants and clear goals for soils by Governments, the processing of development permits has become a bargaining process. Provincial and municipal officials are by and large reluctant to take responsibility to declare a site safe, which is essentially what an approval from an Environment ministry amounts to. Accordingly the approval process often requires extremely rigorous soil standards.

Developers are not well positioned to deal with this excess of zeal. They are reluctant to become politically active because theirs is not generally a popular cause. They also need the cooperation of regulating departments and ministries to operate and are reluctant to complain too loudly for fear of harsher treatment.

Since developers can not get definitive or practical answers from regulators on questions like "how clean is clean"?, or "are engineering solutions that separate users from contaminants allowable?", they simply avoid lands with contaminants where they can.

HOUSING FINANCING ISSUES

The final critical housing issue associated with soil contamination is its startling influence on the financing of real estate, particularly residential real estate. This issue is complex and not yet fully developed. During interviews with the building industry for this study, implications not previously raised were put forward.

First is the problem associated with financing or changing the terms of financing for any property suspected of having contaminated soil. At the time of writing, it is literally impossible to get insurance for such financing. Every financial institution has protected its interests by requiring evidence that there is no soil contamination on site. In the few interviews conducted with the industry this new reality produced a series of stories of ruinous financial consequences caused by minor contaminants discovered subsequent to refinancing applications.

This is as a financial time bomb. It is not possible to know how many buildings are simply impossible to finance and therefore essentially without commercial value.

Second, the liability incurred by any land or building owner found to have contaminants on his or her site is a major concern. Since financial and insurance institutions have protected themselves against these liabilities (and are accelerating efforts to complete their protection), owners, including the owners of public housing, will be required to finance any remediation. It is therefore, important that the methods used to determine contamination and to remediate the site are economically responsible.

Third, the issue described above as an ethical issue facing housing operators is a significant financial issue for housing owners, both public and private. If building owners fail to take reasonable measures to protect residents from known risks, they are potentially liable to those residents. There is concern in the industry that the knowledge that a neighbouring site is contaminated may be construed as sufficient grounds for a successful legal action. When contamination is described generally and is unrelated to risk, this becomes a significant question.

SECTION 5

GAPS AND OPPORTUNITIES

This paper has permitted a brief look at some of the activities and perspectives surrounding the controversial issue of soil contamination as it relates to housing. It has framed the issues and identified the views and concerns of interested parties. But, despite the limited scope of this project, some key areas of further activity and research have become evident. It is hoped that these gaps in knowledge will present an opportunity to the housing sector to clarify solutions to the problems of contaminated soils and housing.

OPPORTUNITIES FOR CHANGE

The time is ripe for change. The market for housing and employment in Canada has been heavily suburban for several years. As Appendix 1 indicates, there is evidence to suggest that changing demographic and economic conditions will support large scale development of housing in the core of Canada's cities in the future. If this can be accomplished, the economic dividend will be considerable. But, as the issues section notes, the current soil standards remain as an impediment to re-urbanisation.

As well, the Canadian policy environment is changing; witness the extensive activities listed in Section 2 of this paper. For example, both the Canadian Council of Ministers of the Environment and the Ontario Ministry of Environment and Energy has realized new contaminated site guidelines need to take into account the proposed future use for these sites. This suggests a need for categories of land-use development that take into account not only the type of land-use, but the degree of human contact which flows from the use.

The Ontario ministry has acknowledged that its changes may allow for partial clean-up on particular sites and the registration of hazardous elements where they will cause no risk to human health or the environment.

Finally, regulators and health professionals appear to be becoming either more flexible -- or less certain -- about the environmental and health risks of what have been considered contaminated soils. The Agency for Toxic Substances and Disease Registry, as well as some provincial environmental regulators, acknowledge that there is a lack of information on human exposure and soil conditions. Some medical officers of health believe that the health risks of contaminated soils are minor in comparison to other, well understood urban risks.

KNOWLEDGE GAPS AND UNANSWERED QUESTIONS

Some obvious knowledge gaps about the relationship between housing and soil contamination appear against this changing policy environment. They are listed here as questions. The answers are neither obvious nor easily devined. Yet as this report has demonstrated, answers are important for housing, for the economy and for the environment. These and other questions should fuel considerably more

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research and a rethinking of the current policy directions.

1. How much land is contaminated given current standards?

There is no inventory of contaminated areas in Canada. Environment Canada's National Contaminated Sites Remediation Program has a rough list of the most notorious, and therefore the most problematic, individual sites. But, as the issue section indicates, many hazardous areas may go undetected or remain non-remediated, because the contamination assessments are only triggered by a redevelopment application – and investors are not submitting development applications for potentially contaminated sites because of liability chill.

Moreover, the required inventory must be of allegedly contaminated areas, and not merely contaminated sites. An inventory of questionable areas suggests a holistic perspective which focuses on entire communities and conurbations, whereas an inventory of sites focuses just on specific pieces of property in isolation of their broader effects and potential benefits.

2. How can all relevant risks associated with contaminated soil be evaluated?

As discussed extensively in the report, human and environmental risks associated with soil contamination go well beyond the question of the presence of contamination. The risks of exposure to contamination must be balanced with the risks associated with urban sprawl, neighbourhood deterioration, the reality that risks may increase if the contamination results in land remaining exposed and fallow for decades, and several other possible consequences discussed earlier.

Neither existing nor proposed procedures begin to meet this challenge. Only the Province of Quebec has formally acknowledged this need in its policy. Yet realistically, a continuation of a narrow focus on the standards that must be met before redevelopment will be permitted, will produce neither a cleaner environment nor improved human health.

3. Within the existing process, how can predictability of costs and assessment results be enhanced?

The development industry cannot function in an atmosphere of uncontrolled risk. The soil contamination processes are viewed by the industry as an uncontrolled risk. If this situation continues contaminated lands will simply not be re-developed and contamination will therefore not be mitigated?

4. How should housing owners and operators deal with the suspicion that existing and occupied housing may be on contaminated land?

Since redevelopment is the trigger for identifying contamination and dealing with it, the current process offers neither guidance nor hope for the serious questions raised by this issue. There is a reluctance to deal with the issue except in the most extreme cases of obvious environmental hazard. The blunt question is; "If the land is not safe for new residents, why is it safe for existing ones?". The report found that local residents turn that question around; "If the land is safe for us, why isn't it safe for redevelopment?".

5. Is there an answer to the "how safe is safe enough" question in the concept of insured risk?

Several people surveyed raised the question of whether a process that brings market forces to bear on the issue might work. This was most articulately suggested by public health officials, who as a group have discussed the issue from time to time. The suggestion is that risk assessment is a function of actuarial probability and many variables can be factored into a calculation of the consequences of various uses of a piece of land. Whether soil contamination can be reduced to an issue of risk assessment and risk insurance is one of the most intriguing questions to emerge. If such an approach proved feasible, it would be in the interests of insurers to ensure adequate levels of life safety.

6. How can area residents be involved and empowered when neighbouring sites are under suspicion of contamination?

This is a particularly important question given that the suspicion of contamination in an area is widely believed to accelerate the decay of a neighbourhood and retard redevelopment. Given the single minded focus of current regulatory approaches that ignore social and community risks, this is a particularly important concern.

7. Can engineered solutions and dilution play more prominent roles in the alleviation of risk from contaminated soil and if so, will the use of these techniques increase the probability of redevelopment and therefore risk reduction?

There is a belief shared by representatives of the building industry, public health officials and some government employees that current procedures contain an unreasonable bias against risk abatement that does not entail actually removing the contaminants. The suggestion is that paving and other forms of separating contaminants from the environment and human contact alleviates risks in many instances. Similarly, the view was expressed that, where concentration of a contaminant was above approved levels, dilution across the site would eliminate risks associated with the contaminant. If these techniques are useful, they may result in lower and more certain costs to developers which in turn increases the probability of redevelopment. There is a suggestion in the draft CCME material that these kinds of solutions may prove useful in some circumstances. Accelerated consideration of this question would be useful.

OTHER OBSERVATIONS

Other perceptions which do not represent knowledge gaps emerged from the preparation of this report. They represent observations about housing and the contaminated soils issue.

First, the housing industry's desire for changes in contaminated soils procedures are part of the industry's general concerns about efficiency and cost effectiveness. The industry is always agitated about duplication at regulatory and approval levels. Soil contamination is an impediment to housing development, but it is also representative of a plethora of concerns that the industry has with governments.

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- reduce government duplication and bureaucracy;
- develop the maximum number of contaminated downtown areas;
- ensure public health protection; and,
 - meet the broadest range of environmental goals, including the key environmental goals of reducing urban sprawl and creating compact urban form.

Second, the beginning of communication is the selection of titles to describe issues. Words define the problem for the public. For example, to one community member surveyed, the term "contaminated" meant "unfit for human habitation"; to another, however, the word simply represented a "relative risk" balanced against other opportunity costs of urban life. "Sustainable development" has been successful as a concept, partly because the term defines a new paradigm of environmental and economic synergy. A similar exercise might be useful in this instance.

For example, "regeneration" might be preferable to "decommissioning"; "complex" might replace "contaminated" soils. Governments are dealing with a cynical and aware public, and dissembling is always suspected in this sort of exercise. But, when faced with the contrasting situation of public unease, as well as an uncertain science, it is important that the language used to communicate risk be as clear and positive as possible. As one Ontario housing official put it,

"contamination should not be considered a crisis; better that it be regarded as a constraint to be overcome in the interests of affordability and intensification."

Finally, CMHC needs to look at its own role in resolving the confusion over contaminated soils. Both representatives of the industry and provincial officials criticized the Corporation's leadership on this matter, stating that its approach would not lead to a dynamic policy environment and could bear further consideration. To most stakeholders CMHC and the CCME define the policy environment. One builder described the Corporation's insurance guidelines as "not conducive to housing development", given the snowball effect that they have had on other regulators and the chilling effect on the financial community. A provincial official suggested that CMHC "needs to be more visionary in their policies" if the Corporation's intensification and affordability goals are to be met.

APPENDIX 1

The Potential Demand for Dwelling Units in the Urban Core

A Review by Strategic Projections Inc.

Introduction

This note was prepared by Strategic Projections Inc. in response to a request from Gardner Church for our assistance in identifying:

the degree to which there has been -- and will continue to be -- a maturing of the household creator in Canada,

the degree to which this group has a proclivity for middle to higher density housing than has been the case in the past, and

the degree to which the demand for ground oriented and/or multiple storey housing on competitively priced downtown sites, therefore, is likely to be greater in the future than in the past.

Background

Strategic Projections Inc. is an information and consulting firm providing both public and private sector organizations with reliable and up to date historical and projected information and assessments regarding the demographic and economic potential of small geographic areas across Canada.

The population models used in preparing our demographic projections are five-year age cohort models which age the population over time adding to each cohort, as necessary, the number born or migrating into that group, and subtracting from that cohort those migrating out of it or dying.

The model incorporates province specific fertility rates for each of seven female child bearing age categories, provincial mortality rates for all age cohorts and net migration shares based on the revealed age distribution of the migrant population at the international, inter-provincial and intra-provincial level. The number of households in each area is projected by applying headship rates by age for that area to the population by age projections.

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General Trends in the Growth of Population and Households

During the 1990s and beyond the major trends characterizing Canada's expected population growth include the following:

a shift in population away from the Atlantic and Prairie provinces toward Central Canada (Quebec and Ontario) and British Columbia;

a shift away from rural to urban areas, even in those provinces witnessing relatively low population growth;

a shift in the age structure of the population - the number of persons aged 25 to 34 will decline, the number under 25 and between 35 and 44 will increase slightly while those 45 to 54, 55 to 64 and 65 and over will increase significantly.

At this time Canada's underlying population growth is driven about one-half by the net natural change in population -- births less deaths -- and one half by net international migration -- immigration less emigration. By the year 2001 net international migration will account for more than two-thirds of the total population growth. Where provincial and sub-provincial population growth rates vary significantly from the national average the difference occurs primarily because of differences in migration patterns rather than differences in fertility and mortality rates.

Migrants tend to be relatively young people -- usually under 35 years of age -- and often are married with young children. Since areas of the country growing faster than the national average do so because of positive net in-migration, such areas will be also be growing quickly among those aged less than 35 years, despite the national trends noted above. This also means that areas of the country witnessing slow growth and net out-migration will see significantly greater population declines among those under 35 than is the case at the national level.

Within major municipal areas it is typically the case that the population of the urban core remains relatively constant over time while its suburbs attract most of the growth. The age profile of the urban core, therefore, reflects the changes characterizing a non-growing area while that of the suburbs reflects the changes characterizing growing centres.

Population and Household Projections for the Greater Toronto Area

For the purposes of this note we have prepared two population and household simulations, one for Metro Toronto and the other for the area defined by the sum of Metro's four suburban Regional Municipalities: Durham, York, Peel and Halton. These simulations -- covering the period from 1992 to 2011 -- provide valuable insights into the potential demand for new dwelling units by structural type within this rapidly growing urban environment. The conclusions derived from this analysis could be applied to any major urban area in Canada.

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In 1991 the population of the Greater Toronto Area exceeded 4.2 million people, with 2.3 million in Metro and 1.9 million in the suburban Regions. Over the course of the next 20 years -- assuming that fertility and mortality rates in Ontario hold steady at the levels prevailing in recent years and that the national level of immigration holds steady at 250,000 persons per year -- the GTA could grow to about 5.2 million by 2001 and to almost 6.0 million by 2011.

Different rates of fertility, mortality and immigration would obviously produce different results. These assumptions provide a reasonable base against which to assess the question regarding the potential for future densification.

We have prepared simulations of the expected population growth in the GTA in two stages:

1) The first projection covers Metro Toronto only. It is assumed that net migration into the Metro area over this entire 20 year time span would equal 0; in other words, it is assumed that any in-migration into Metro would be fully offset by an equivalent level of out-migration. It is assumed, therefore, the existing population of the Metro area in 1991 will simply age in place.

This assumption would lead to an increase in Metro's total population over this period by some 229,000 persons as births among the population exceed deaths. To accommodate this population growth a total of 94,000 new dwelling units would be required. This household growth would be the result of the maturation of those currently under the normal age of household headship.

The second projection covers the area defined by the four Regions of the GTA. It is assumed that most out-migrants from the urban core and from other parts of the province or country would be absorbed within this area.

This assumption results in an increase in the population of the four Regions over this period by some 1,506,000 persons reflecting the effects of both the net natural change in population plus net in-migration. To accommodate this growth a total of 548,000 new dwelling units would be required.

Thus the GTA, in total, would require more than 642,000 new dwelling units -- about 32,000 per year -- over this 20 year period to accommodate the population growth resulting from the assumptions made here. Chart 1 illustrates that the Metro-Regional split of population growth assumptions suggest the total number of dwelling units among the four suburban Regions would exceed the number in Metro Toronto by the year 2003.

Implications of the Population by Age Projections

2)

Chart 2 compares the absolute distribution of the population by age in Metro Toronto in 1991 to that of its four suburban Regional Municipalities. Metro's total population exceeded that of the four Regions by 316,000 persons. By age group, however, the Regions collectively accounted for more persons under the age of 20 than Metro, and almost as many persons aged 35 to 49 as Metro. Only in the age groups from 20 to 34 and over the age of 50 did Metro's population significantly exceed that of the same age groups among the four Regions.

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Chart 3 compares the change in population expected by age over the period from 1991 to 2001 in Metro and the Regions. Metro can be expected to lose population among those aged 20 to 34 -- these people are in the early stages of family formation and are highly mobile -- and can be expected to witness population growth among all the other age groups at rates much lower than the gains expected by the four suburban Regions. In the suburbs even the population among those aged 20 to 34 is likely to increase (many of them would be relocating Metro residents).

Chart 4 compares the projected changes over the period 2001 to 2011. During this period Metro's population base among those aged 25 to 44 and among those under 10 could be expected to decline given the relative mobility of individuals in these age groups. Again, however, the population within the four Regions would be expected to increase among all age classes.

Chart 5 indicates the implications of these changes over the next two decades for housing requirements in Metro Toronto while Chart 6 indicates the implications for requirements in the suburban Regions.

For Metro Toronto (Chart 5) the conclusions are as follows:

the need for dwelling units to accommodate households headed by individuals under the age of 25 is about right at this time and would not likely change much over the projection horizon;

the need for dwelling units to accommodate households headed by persons aged 25 to 34 would likely decline in both decades;

the need for dwelling units to accommodate households headed by persons aged 35 to 44 will decline in the 90s then grow moderately between 2001 and 2011;

the need for dwelling units to accommodate households headed by persons over 45 years of age will increase significantly over the entire period.

For the suburban Regions (Chart 6) the conclusions are as follows:

the need for dwelling units to accommodate households headed by individuals under the age of 25 is about right at this time and would not likely change much over the projection horizon;

the need for dwelling units to accommodate households headed by individuals over the age of 25 is significant, especially among those aged more than 45 years, over the entire period.

Table 1 summarizes the projected overall change in need for dwelling units over the entire 20 year period for each of Metro and its four suburban Regions. The key conclusions to be drawn from Table 1 include the following:

more than 642,000 new dwelling units in total will be required within the GTA between 1991 and 2011;

more than 580,000 of these new units will be occupied by persons over the age of 45 years;

within Metro householders over 45 will require 174,000 more units while householders under

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45 will require 80,000 fewer units than existed in 1991 for an overall net increase of just over 94,000 new dwelling units;

within the four suburban Regional Municipalities householders over 45 will require more than 406,000 new dwelling units while householders under 45 will require almost 142,000 new units for a total of 548,000

Table 1Projected Dwelling Unit Requirements ForThe Greater Toronto Area Between 1991 and 2011Metro Toronto Compared to the Surrounding Regions

AGE GROUPS	METRO	REGIONS	TOTALS
25 and under	-274	11,019	10,745
25 to 34	-72,093	52,786	-19,307
35 to 44	-7,876	77,841	69,965
45-54	68,987	128,521	197,508
55-64	46,669	128,468	175,138
65 and over	58,633	149,385	208,018
TOTALS	94,046	548,021	642,067

Source: Strategic Projections Inc.

In 1991 about 63.7 percent of all households headed by a person over 45 occupied single-detached dwelling units in the Province of Ontario, a proportion that has been increasing slightly in recent years. Chart 7, however, reveals that the proportion of single-detached dwellers reaches a peak in the province between the ages of 45 and 54 at 67.5 percent, then gradually declines with age falling to just 51.8 percent among those aged over 75 years. This declining share is mainly offset by an increase in the share of those occupying apartment dwellings of 5 storeys or more.

Only 11.2 percent of householders aged 45 to 54 occupied such units in 1991 compared to 19.5 percent among those 65 to 74 and 28.2 percent among those over 75. The share of households occupying other dwelling unit types -- a group including low-rise apartments, other semi-detached units and movable units -- held fairly steady at around 20 percent among all of the household maintainer age groups over 45.

In other words, about one-third of the units occupied by households headed by individuals over 45 years of age were other than single-detached dwelling units.

Conclusions

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Our projections indicate:

- a total of 174,000 new dwelling units will be required by householders over the age of 45 years in Metro over the next two decades, and
- a total of 406,000 new dwelling units will be required by householders over 45 in the four suburban Regional Municipalities.

If one-third of these householders choose accommodation other than single-detached units -- as was the case in 1991 in the province of Ontario -- the demand for higher density units among those over 45 within the GTA as a whole will total more than 190,000 units.

If a significant number of these households could be attracted – through product availability and competitive pricing – to locate in higher density units within Metro itself it is clear that the imbalance of dwelling needs between the urban core and its suburban Regions implied by Table 1 could be significantly reversed.

Even if the GTA does not attract as much population growth over the next 20 years as is assumed here, this same conclusion can be drawn.

While this point is illustrated using the case of the GTA these simulation results would hold whether the urban environment in question is that of Montreal, Vancouver or any of Canada's other major urban centres.

Based on this evaluation it can be concluded, therefore, that because of:

the changing age structure of Canada's population over the next 20 years,

the relative attractiveness of major urban centres for new population growth, and

the proclivity of a significant proportion of householders over 45 years of age to seek accommodation in other than single-detached units

urban planners would be well advised to find ways to facilitate the creation of higher density accommodation within the urban core areas of such centres.

The results here suggest there will be an overwhelming demand for such units within the metropolitan environment and -- if such units could be offered in the urban core at competitive prices -- the potential for core densification, therefore, would be significant.

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Chart 1

Dwelling Units in the GTA Metro and the GTA's Regional Municipalities 1981 to 2011 Metro Toronto - GTA's Regional Municipalities 1,200,000 1,000,000 800,000 600,000 400,000 81 83 85 87 89 91 93 95 97 99 01 03 05 07 09 11 Metro Toronto and its Regional Municipalities Population by Age 1991



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Chart 3

Metro Toronto and its Regional Municipalities Change in Population by Age 1991 to 2001



Metro Toronto and its Regional Municipalities Change in Population by Age 2001 to 2011



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Households by Age of Maintainer 1991 Projected Change 1991-2001 and 2001-2011 GTA's Regional Municipalities

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Households in Ontario By Age of Maintainer by Structural Type As % Share of Households Within Age Group 1991



APPENDIX 2

LIST OF PERSONS AND GROUPS CONTACTED

Miles Addison, Canadian Bar Association

Serge Barbeau, Ville de Montréal

John Bassel, Arcadia Group

Claude Bennett, Canada Mortgage and Housing Corporation

Beth Benson, Waterfront Regeneration Trust

Dr. Blatherwick, Medical officer of Health, Vancouver

Dr. Bolton, Medical Officer of Health, Sudbury

Ted Bright, Ministry of Environment and Energy, Ontario

Fergy Brown, City of York

Ken Cameron, Greater Vancouver Regional District

Canadian Bankers' Association*

Canada Mortgage and Housing Corporation*

Canadian Real Estate Association*

Mark Conway, Toronto Economic Development Corporation

Catherine Crook, Canadian Bar Association, Montreal

Phil Ferguson, Canadian Urban Institute

Richard Gilbert, Organization for Economic Cooperation and Development

Murray Haight, University of Waterloo

Darryl Hogg, Ministry of Environment and Energy, Ontario

April Ionson, City of Cambridge

Marie-Renée Jobin, Ministère De L'Environnement, Quebec

Morton Kaiserman, Canadian Standards Association

Morley Kells, Urban Development Institute (Ontario)

Bryan Kozman, Ministry of Housing, Ontario

John Kenward, Canadian Homebuilders Association

Dennis Lang, Toronto Harbour Commission

Ned Lynch, Environment Canada

Ed Machej, Mortgage Insurance Company of Canada

Larry Martin, University of Waterloo

Mike McCloud, Ministry of Environment and Energy, Ontario

Kevin McKinley, Canadian Standards Association

Lewis Molott, York University

National Centre for Disease Control, Agency for Toxic Substances and Disease Registry, Atlanta, Ga. U.S.A.*

Clive Oldreide, Ministry of the Environment, Nova Scotia

Darlene Pearson, Canadian Bar Association

Harry Poch, Environmental lawyer

Ed Sajecki, City of York

Helene St. Jacques, Professional focus group facilitator

Sam Tassone, The Daniels Group

Sally Thorson, Region of Waterloo

Allan Tonks, Metropolitan Toronto

Sassy Waddell, Corktown Residents Association

SNC Lavelin, Environmental Planning and Assessment Group, Montreal*

City of Victoria*

John Wiens, Ministry of the Environment, British Columbia

Dave Wotton, Ministry of the Environment, Manitoba

 Where an organization is named without a contact, one of three situations prevailed: anonymity was requested or written material was sent without individual input or contact was with a variety of sources within the organization.

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APPENDIX 3

ANNOTATED BIBLIOGRAPHIC EXTRACT

This biographical appendix in unusual in two respects; none of the material in the appendix was used in compiling the report, and the sources listed do not include the obvious material used in Canada when dealing with soil reclamation and housing. The purpose of this annotated bibliography is to highlight less familiar source material that pertains to the issue and may be of use to researchers.

These sources were extracted from a much larger companion report by 11 Corinfo of North Bay. The two volume companion report has been submitted to CMHC. It contains an annotated bibliography on the issue of the reclamation of post-industrial lands and soil contamination. While many of the references have no direct relationship to housing, the scientific, economic and environmental issues they explore are of direct relevance to any further research of remediation from the perspective of housing.

The extracts here were chosen because of one or more of three factors:

- direct relevance to housing and soil contamination
- bibliographies that pertain to the issue covered in the report
- unique material on soil contamination standards and effects but not related to housing.

COMPANY: CN Real Estate Ltd.; Marathon Realty Co. Ltd. (CanCorp Company Number: CA001938); Trizec Equities Ltd.; Bramalea Ltd. (CanCorp Company Number: CA014961)

Fate of \$3b plan put to vote Daily Commercial News v.65(178) September 14, 1992 pg 1 Special Features: Abstract available Descriptors: Toronto (Ont)--Planning and development

Toronto City Council is making a final decision on development of the western portion of a derelict 200-acre railway lands site by developer CN Real Estate Ltd. CN's \$3b CityPlace development could provide about 20,000 jobs over the next 15-20 years and boost the city's economy. Development of the eastern portion of the railway lands owned by Marathon Realty Co. Ltd. and a partnership of Trizec Equities and Bramalea Ltd. has been approved by council but awaits Ontario Municipal Board (OMB) approval.

The agreement, if approved, will allow CN nearly 3.7 million sq ft of commercial space and 4,550 residential units. Community infrastructure is expected to cost \$100m, of which \$37m is to come from the city. Provincial assistance for the social housing in the project is expected to be at least \$100m.

Solving the reclamation puzzle: awareness and technology are the keys to passing the dreaded inspection

Oilweek v.43(38) September 21, 1992 pg 23-28 Special Features: Photograph Descriptors: Reclamation of land

Providing affordable housing on contaminated land in Ontario

Author: Weninger, Jane M Canadian Housing v.7(2) Summer, 1990 pg 24-31 Special Features: Graphic Descriptors: Housing--Toronto; Reclamation of land; Low cost housing

Toxic Cleanup of 13 Bases Estimated to Top \$3 Billion

Environment: State says costs for El Toro, Seal Beach facilities would be \$325 million. Officials want to ensure availability of U.S. funds before a final decision is made on military closures. Los Angeles Times (LT) - TUESDAY June 15, 1993 By: MARLA CONE; TIMES STAFF WRITER Edition: Orange County Edition Section: Metro Page: 1 Pt. B Col. 4 Story Type: Infobox Word Count: 792

Monitoring of Cleanup Urged at Railroad Yard

Los Angeles Times (LT) - THURSDAY April 22, 1993 By: ANNE KLARNER; SPECIAL TO THE TIMES Edition: Home Edition Section: Glendale Page: 5 Pt. J Col. 1 Word Count: 380

Reports Cite Soll Contamination

Los Angeles Times (LT) - WEDNESDAY February 24, 1993 By: KAY SAILLANT Edition: Ventura County Edition Section: Metro Page: 2 Pt. B Col. 3 Story Type: Column; Brief Word Count: 185

CLEANING UP SOIL CONTAMINANTS Researchers to test new technique at plant Daily News of Los Angeles (LA) - SATURDAY April 24, 1993 By: Jim Skeen Daily News Staff Writer Edition: AV Section: NEWS Page: AV1 Word Count: 546

STUDIES FIND BPA SITE NO THREAT TO VANCOUVER Oregonian (PO) - WEDNESDAY, June 2, 1993 By: BILL STEWART - of the Oregonian Staff Edition: FOURTH Section: NORTH ZONER Page: B02 Word Count: 553

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SITE CLEANUP PRIVATE MATTER

OREGONIAN (PO) - MONDAY, April 5, 1993 Edition: FOURTH Section: EAST ZONER Page: B02 Word Count: 246

NEIGHBORS SEEK TO BAN PLANT FACILITY TO TREAT CONTAMINATED SOIL

Arizona Republic/Phoenix Gazette (AZ) - WEDNESDAY, June 9, 1993 By: Laura Plachecki, Staff writer Edition: Final Section: Downtown/South Community Page: 1 Word Count: 640

DUMPING ON THE POOR: WHY ARE TOXIC INDUSTRIES MOST OFTEN FOUND IN MINORITIES' NEIGHBORHOODS?

Phoenix Gazette (PG) - SUNDAY, April 25, 1993 By: David Hoye, THE PHOENIX GAZETTE Edition: Final Section: Front Page: G1 Word Count: 1,841

About Du Page. Environment - Towns use 2 ways to clean up buried trouble Chicago Tribune (CT) - TUESDAY August 17, 1993 By: Ted Gregory, Tribune Staff Writer Edition: DU PAGE SPORTS FINAL Section: DU PAGE Page: 2 Zone: D Word Count: 759

City agrees to clean up site of former recycling center Chicago Tribune (CT) - MONDAY April 12, 1993 By: Suzanne G. Hlotke Edition: DU PAGE SPORTS FINAL Section: DU PAGE Page: 3 Zone: D Word Count: 192

CORNELIUS CONSIDERS FUTURE FOR VACANT MILL BUILDING Charlotte Observer (CO) - SUNDAY, March 21, 1993 By: PAT BORDEN GUBBINS, Staff Writer Edition: FOUR Section: MECKLENBURG NEIGHBORS Page: 6 Word Count: 563

EPA to Test Back-Yard Soli in Area Near Torrance Los Angeles Times (LT) - WEDNESDAY September 1, 1993 Edition: Home Edition Section: Metro Page: 2 Pt. B Col. 3 Story Type: Column; Brief Word Count: 132

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City to Help Builder Buy Tainted Property Los Angeles Times (LT) - FRIDAY August 6, 1993 By: PATRICK McCARTNEY Edition: Ventura West Section: Metro Page: 2 Pt. B Col. 2 Story Type: Column; Brief Word Count: 284

AUTHOR: Cohen, Armond. TITLE: Poletown, Detroit : a case study in "public use" and reindustrialization.

PUBLICATION INFO: [Cambridge, Mass.] : Lincoln Institute of Land Policy, c1982. PHYSICAL DESC: v, 43 p. : ill.

TITLE SERIES: Lincoln Institute monograph ; #82-5

NOTE: Includes biblioghraphical references.

SUBJECT: General Motors Corporation.

SUBJECT: Land use - Michigan - Detroit - Case studies.

SUBJECT: Automobile industry - Michigan - Detroit - Case studies.

SUBJECT: Factories - Michigan - Detroit - Location - Case studies.

SUBJECT: Poletown (Detroit, Mich.)

OTHER AUTHOR: Lincoln Institute of Land Policy.

AUTHOR: Tanghe, Jan.

TITLE: Living cities : a case for urbanism and guidelines for

re-urbanization / by Jan Tanghe, Sieg Vlaeminck, and Jo Berghoef, with contributions by Catherine Bruant ... [et al.]; translated by Ronald Southam; translation edited by Barry Needham.

EDITION: 1st English ed.

PUBLICATION INFO: New York : Pergamon Press ; Oxford [Oxfordshire], c1984.

PHYSICAL DESC: xii, 373 p. : ill. ; 22 cm.

TITLE SERIES: Pergamon international library of science, technology, engineering, and social studies.

NOTE: Includes bibliographical references and index.

NOTE: "Originally written in Dutch in 1975 under the title Wonen

of wijken?"--Pref.

SUBJECT: Man - Influence of environment.

SUBJECT: Quality of life - Europe.

SUBJECT: Cities and towns - Europe.

SUBJECT: Urbanization - Europe.

SUBJECT: Housing - Europe.

OTHER AUTHOR: Viaeminck, Sieg, 1933-

OTHER AUTHOR: Berghoef, J. F.

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AUTHOR: WHO Expert Committee on Environmental Health in Urban Development.

TITLE: Environmental health in urban development : report of a WHO Expert Committee.

PUBLICATION INFO: Geneva : World Health Organization, 1991.

PHYSICAL DESC: vi. 65 p.

TITLE SERIES: Technical report series (World Health Organization) 0512-3054 ; 807

NOTE: "A WHO Expert Committee on Environmental Health in Urban

Development met in Geneva from 17 to 23 April 1990"--P. 1.

NOTE: Includes bibliographical references (p. 63-65)

SUBJECT: Urbanization - Environmental aspects.

SUBJECT: Environmental health.

SUBJECT: Urban health - Planning.

TITLE: Environmental assessment South Quarry landfill development, final report to Steetley Quarry Products Inc. (microform) PUBLICATION INFO: [Toronto] : Ontario Ministry of Government Services, [1990] PHYSICAL DESC: 16 fiches : negative, ill. ; 11 x 15 cm. NOTE: Report submitted to the Ontario Ministry of the Environment. NOTE: Reproduction of original published: [Toronto,] : MacLaren Plansearch Lavalin, 1990. NOTE: "5143-90." SUBJECT: Quarries and quarrying - Environmental aspects - Ontario. SUBJECT: Reclamation of land - Ontario. OTHER AUTHOR: MacLaren Plansearch (Firm)

OTHER AUTHOR: Steetley Quarry Products. Inc.

OTHER AUTHOR: Ontario. Ministry of the Environment.

TITLE: Environmental restoration : science and strategies for

restoring the Earth / edited by John J. Berger. PUBLICATION INFO: Washington, D.C. : Island Press, c1990. PHYSICAL DESC: xxiv, 398 p. : ill. ; 24 cm. NOTE: Papers from Restoring the Earth Conference, held in Jan. 1988 at the University of California, Berkeley; convened by the staff of Restoring the Earth, and cosponsored by the College of Natural Resources and the Center for Environmental Design Research of the University of California, Berkeley, and by the San Francisco Bay Conservation and Development Commission. NOTE: Includes index.

NOTE: Bibliography: p. 375-383.

SUBJECT: Reclamation of land - Congresses.

SUBJECT: Restoration ecology - Congresses.

OTHER AUTHOR: Berger, John J.

OTHER AUTHOR: University of California, Berkeley. College of Natural Resources.

OTHER AUTHOR: Restoring the Earth (Organization)

OTHER AUTHOR: University of California, Berkeley. Center for

Environmental Design Research.

OTHER AUTHOR: San Francisco Bay Conservation and Development Commission. OTHER AUTHOR: Restoring the Earth Conference (1988 : University of California, Berkeley).

••• URBAN SOIL CONTAMINATION AND HOUSING •••
Ti: Hazardous waste sites and property values in the state of New Jersey. AU: Ketkar.-K.

AD: Department of Economics, W. Paul Stillman School of Business, Seton Hall University, South Orange, NJ 07079-2692, USA

SO: Applied-Economics, 1992, 24(6), pp 647-659.

PY: 1992

LA: English

AB: The polluter pays principle is justified as a deterrent to future pollution. However, the US

experience suggests that it has considerably reduced the clean up rate of existing hazardous waste sites. Coase's theorem is used as basis to propose that a partnership between the polluters and property owners near these

sites will not only ease financial burden but will also speed up the pace of cleanup. A hedonic price model is used to empirically estimate the impact of siting of hazardous waste sites on property values and determine the economic feasibility of the proposed partnership. The empirical estimates are based on municipality level data from the state of New Jersey. The benefits from speedy

clean up of hazardous waste sites to New Jersey property owners are observed to exceed the cleanup cost of these sites. -Author

DE: waste-disposal; statistical-analysis; site-remediation; property-value; polluter-pays-principle; hazardous-waste; hedonic-price-model;

empirical-estimate; USA-; New-Jersey

SC: 1 Geography

AN: (0946692); 92H-07895

TI: Effects of hazardous waste risks on property transfers: legal liability vs. direct regulation. AU: Dinan,-T.; Johnson,-F.-R.

SO: Natural-Resources-Journal. 1990. 30(3), pp 521-536.

PY: 1990

LA: English

AB: Given the probable large number of sites contaminated with hazardous wastes, there could be significant benefits from a statutory system that effectively deters future contamination and encourages private remediation of existing sites. We compare the effectiveness of Superfund liability rules with New Jersey's ECRA regulatory program to clean up contaminated sites at the time of

property transfers. Our analysis indicates that regulatory delays raise private costs under ECRA relative to Superfund alone, but that external benefits of ECRA cleanup activities are greater as well.

Furthermore, it is likely that

unmitigated damages are less under ECRA. -Authors

DE: DE-site-contamination; waste-risk; pollution-reduction; hazardous-waste;

USA-; New-Jersey

SC: 1 Geography

AN: (0861272); 91H-03552

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Appendix 3, Page 6

TI: Considerations about dereilct industrial land concept.

OT: Consideraciones en torno al concepto de vaciado industrial.

AU: Pardo-Abad,-C.-J.

SO: Estudios-Geograficos. 1991. 52(202), pp 89-107.

PY: 1991

LA: SPANISH

AB: Derelict industrial land is an important aspect of recent urban transformations. Closing or movement of establishments makes vacuums in town. If the phenomenon is extensive the image of town is gravely damaged, giving derelict factory a desolate spectacle. The term derelict industrial land is defined and the interpretations that this process has received in the foreign bibliography are presented, above all in France and Germany. These vacuums are interpreted as a component of industrial change and as a potential of urban renewal. -English summary

DE: derelict-land; industrial-area; urban-area; structural-change

SC: 1 Geography

AN: (0931503); 92H-05229

Ti: Recycling derelict land.

AU: Fleming.-G.

SO: (Thomas-Telford, for-Institution-of-Civil-Engineers). 1991, 218 pp, index.

PY: 1991

LA: English .

AB: Provides practising engineers with a firm basis on which to classify types of derelict land, and also alert them to the wide range of significant environmental and legal considerations. It examines the many hazards involved in land recycling, from geotechnical and hydrogeological, to chemical and biological, and emphasises the need for an integrated approach to site investigation, showing the interaction between physical, chemical, and biological aspects of a particular site.

Data from case studies illustrate analysis and interpretation procedures, and note trigger concentrations and

sampling errors; since the planning process places the responsibility for disclosing contamination with developers rather than planning authorities, it is essential for engineers to understand current knowledge in all aspects of

recycling derelict land. Individual chapters discuss the problem of marginal and derelict land, controls on its reuse, hazards in land recycling, site investigation, data analysis and interpretation, options for problem-solving, and logistics for selecting the final solution. -P.Hardiman

IS: (hardback) 0-7277-1318-3

DE: site-investigation; planning-process; data-analysis; land-recycling;

derelict-land

SC: 1 Geography

AN: (0869834); 91H-06267

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Appendix 3, Page 7

TI: Britain: new lives for derelict lands.

AU: Holden,-R.

SO: Landscape-Architecture. 1989. 79(5), pp 50-52.

PY: 1989

LA: English

AB: Outlines the nature of post-war landscaping of reclamation sites in the UK.

Since 1981 the Department of the Environment has directed grants for commercial, industrial or residential uses, with priorities being: recycling urban land for development in the inner cities to spur private-sector development; improving the environment in the inner cities and removing coal mine spoil; and relieving

development pressure on open land. Concentrating on regeneration of the worst urban industrial land, grants have in particular been offered to industrial areas in the North of England, the Midlands and parts of London. Garden festivals at Liverpool and Glasgow have been showcases for such design work.-P.J.Jarvis

DE: DE-land-reclamation; garden-festival; reclamation-site; derelict-land; UK-

SC: 1 Geography

AN: (0849958); 91H-02219

Cost Effective Management of Reclaimed Derelict Sites. 96p. 1990. Paper. \$47.00. (ISBN 0-11-752258-9, HM2589). UNIPUB.

Building on Marginal & Derelict Land. 884p. 1987. \$94.00. (ISBN 0-7277-0364-1, T Telford UK). American Society of Civil Engineers.

Huls, Mary E. Reclaiming Derelict Land: A Bibliography of Recent Landscape Architecture Literature. (Architecture Ser.: A 1745). 7p. 01/1987. \$3.00. (ISBN 1-55590-155-7). Vance Bibliographies.

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