

HISTORICAL LAND USE INVENTORIES: A GUIDE TO THEIR CREATION

Scott M. MacRitchie

MacDiamond Environmental Services

David A. Block

Masters Program

Faculty of Environmental Studies

York University

ABSTRACT

Many Ontario municipalities contain formerly industrial and commercial land (brownfields) which is now available of re-use as parkland, residential, green industrial and other land uses. Developing municipal historical land use inventories for identifying potentially contaminated sites is a first step in the safe redevelopment of this land. The Canadian Urban Institute and the Environmental Protection Office, City of Toronto, developed a guidebook for municipalities which want to create their own inventories of historical land use.

The guide defines a step-by-step process that begins with defining the scope of the inventory, then provides options for inventory design and format, identifies historical and environmental sources of information, and the need for maintenance and defining municipal liability. An example of simple inventory that illustrates the various sources of information is provided in an appendix.

An inventory of historical land uses can be a first step to more comprehensive environmental inventories that will provide information vital to the ecosystem approach and to planning for sustainability. Knowledge of the past is essential to building safe and enduring communities for the future

Introduction

When addressing issues of intensification, the Canadian Urban Institute investigated the topic of potentially contaminated sites and found that few municipalities had identified such sites. It was learned that no generic methodology for establishing and maintaining inventories of potentially contaminated sites existed. The concern was that municipalities should be planning for intensification through redevelopment of these sites, yet had no indication of where contaminated sites may be located and no tool to help them, except on a site-by-site basis. It was also learned that the Ontario Ministry of Health was working on directives to local boards of health requiring the identification of public health risks, which included contaminated sites.

With a grant from the Ontario Ministry of Housing and in partnership with the old City of Toronto's Environmental Protection Office, the Canadian Urban Institute prepared a guidebook for municipalities, public health officials and others, on how to create historical land use inventories of potentially

contaminated sites.

Background

Intensification is the redevelopment, primarily residential redevelopment, of already urbanized lands at (usually higher) densities capable of supporting public transit (Paehlke, 1990 p. 5). If cities can reuse previously developed lands they can accommodate their growing populations by making use of already existing infrastructure. At the same time intensification can redirect at least some development away from greenfields areas thus contributing to the reduction of urban sprawl. Thus intensification can save financial resources while at the same time reduce the negative impact urban areas have on the natural environment (Blais, 1996; Paehlke, 1990).

Much of the industrial and commercial land within Canadian municipalities is currently vacant or under utilized and provides an enormous opportunity for implementing intensification. However, due to past practices for managing industrial and commercial wastes, this land may be contaminated or contain other types of hazards. As a result, this land cannot be redeveloped without prior remediation. In Ontario alone there are many examples of interrupted and halted construction of redevelopment projects because unexpected hazards were encountered. For example, in Waterloo the discovery of tanks containing coal tar halted excavation for a new civic centre (Paul Eichenger, personal communication); workers at a new subdivision in Pickering complained of skin irritation and all work stopped when excessive lead was found in the soil (Waters and Fitchko, 1990); and, the groundwater pumped into the Ottawa River from an excavation for a transit way left an oily sheen and contaminated the river's sediments (Ontario Ministry of the Environment, 1987).

Purpose

A municipal historical land use inventory has been defined as a systematic collection of information on the type and location of past land uses that could have caused contamination of soil or groundwater. Developing historical land use inventories is a first step in the safe redevelopment of areas for intensification. The guidebook, *Historical Land Use Inventories A Guide for Ontario Municipalities*, aids municipalities in creating historical land use inventories. The guide was designed to provide municipalities with an understanding of the utility of historical land use information, the components of a historical land use inventory, and the tools to design an inventory to meet the unique needs of municipalities.

Applications of Historical Land Use Inventories (HLUI)

An inventory can be useful to various municipal departments. When a proposal to redevelop land is submitted to a municipal planning department, the location of the redevelopment can be checked with the inventory. If the site is present in the inventory, then the municipality may inform the proponent that an environmental site assessment is required to address potential environmental concerns. Other municipal departments that would make use of an inventory include: public works departments for investigating areas prior to excavating for new roads or services; and public health departments to meet guidelines for health programs and services.

The development and real estate industries need to know about the past uses on land that is already owned or about to be purchased. As an example, the real estate developers in Niagara Falls have become one of the most active users of the historical land use inventory within this municipality. Moreover, since members of the public and interest groups may also want access to this information, most sources of information used to create the inventory are publicly available¹

Potential Benefits of a Historical Land Use Inventory

The time and effort needed to create a historical land use inventory can be justified by its benefits to a municipality. In addition to avoiding costly construction delays, the inventory would be important for determining areas within the municipality that may not be suitable for all land uses. In some cases, the cost of remediating contaminated sites could be prohibitive. In such cases, land uses may have to be chosen to fit the condition of the land rather than remediating the site to a state suitable for certain land uses such as housing.

Environmental protection programs such as ground water protection strategies would use an inventory to identify potential sources of contamination, as is being done in the Region of Waterloo in Ontario. In addition to historical land use information, the inventory can be expanded to include environmental information such as type of soil, proximity of watercourses or sensitive environmental receptors.

Methods of Development

The content and the methods were based on the information and experiences of the four municipalities in Ontario that have already created their own historical land use inventories: the City of Niagara Falls; the Region of Waterloo; the old City of Toronto; and, the City of Ottawa.

Two focus groups consisting of consultants, and municipal and provincial officials were held in Toronto and London to incorporate feedback from potential users of the guide. The result is a broadly based and researched document that provides options for large and small municipalities.

Creating a Historical Land Use Inventory

For a detailed description of the key steps in creating a historical land use inventory refer to the *Historical Land Use Inventories: A Guide for Ontario Municipalities*. The key steps are:

- defining the scope of the inventory;
- designing the inventory and selecting a presentation format;

¹ The one major exception are fire insurance plans. In some cases the only copy of fire insurance plans for a site are held by Insurer's Advisory Organization (1989), Inc. In order to have access to them, interested parties must contact the organization. See section 5.2.3 - Historical Information Sources - of the Guide for more information.

- _ collecting the information, and;
- _ maintenance

Defining the Scope of a Historical Land Use Inventory

Defining the scope of the inventory involves identifying the objectives of the inventory's potential users and their requirements. These objectives are used to determine the contents of the inventory. Priorities may be set by considering: the type of land use activities, such as industrial or commercial uses; the scale of particular activities; certain geographic areas, including those under going pressure for redevelopment or proximity to environmentally sensitive areas; and the level of detail of the information sought. The content of the inventory can be selected from any of the seventeen information categories identified in the guide.

Designing the Inventory and Presentation Format

The differing needs and resources of different municipalities require that the guide allow for flexibility in the design of an inventory. To illustrate the variation in levels of detail and extent of possible inventories, three basic types are described in the guide:

1. *Areas of interest.* This type of inventory may be adequate for municipalities with limited resources and who wish to use the inventory as a tool for basic screening. It identifies and provides location information on areas which are of interest to the municipality. Such areas may include industrially zoned land, lands created by lake and land filling, waste disposal sites, sites occupied by potentially contaminating activities and sites under pressure for redevelopment (Figure 1).

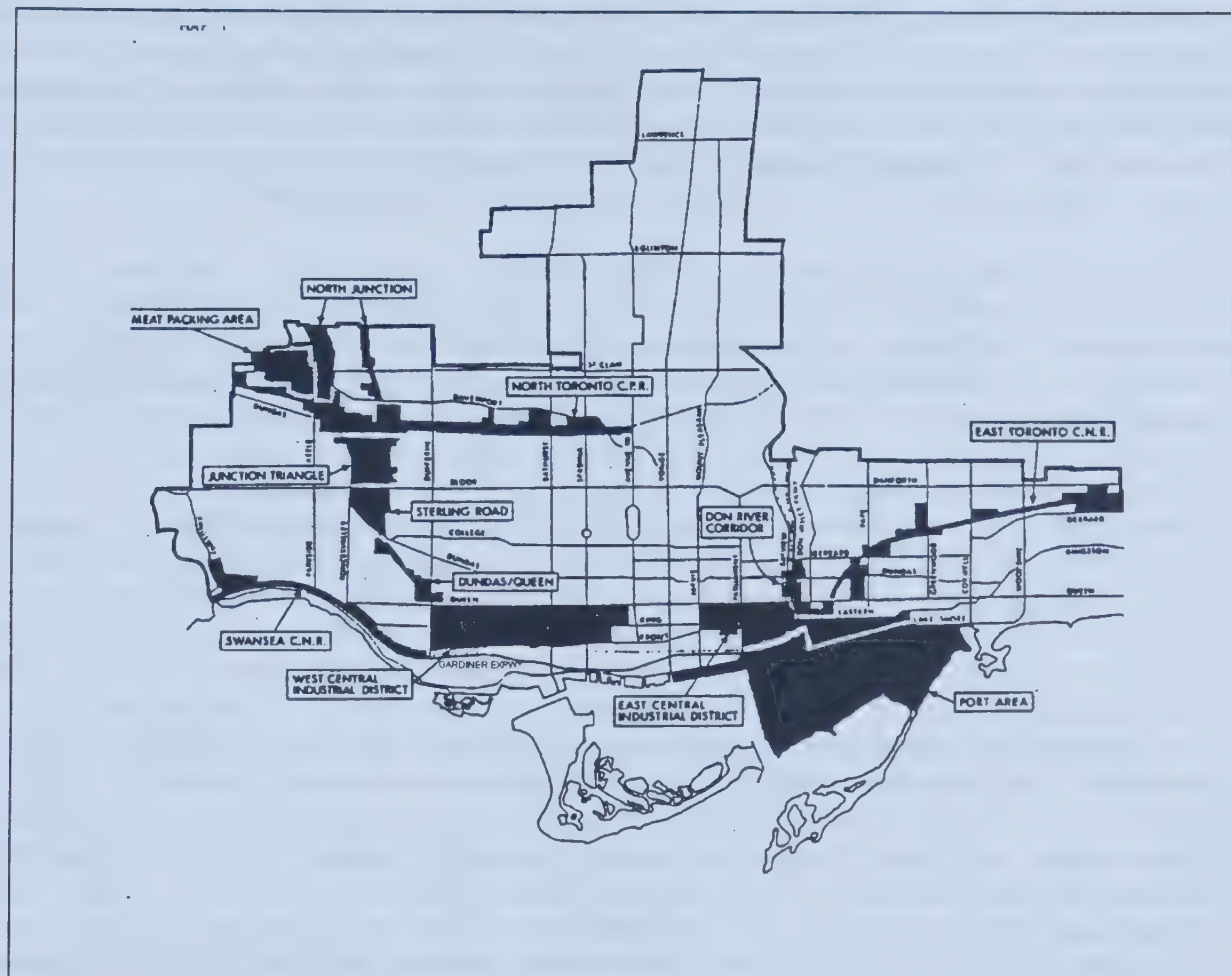
2. *Historical Land Uses.* This type of inventory includes the location information covered in the first type of inventory, but also includes more detailed information about specific past land uses at a given location (Table 1).

3. *Potential environmental concerns.* This type of inventory builds on information used to construct the first two plus information which can be used to assess potential environmental hazards. This information includes the location of **underground storage tanks, pits, lagoons, the scale of the industry and its products**, and physical features such as **surficial geology, proximity to water courses and well head protection areas**.

A municipality's inventory could also be customized to include a combination of each type, or its own unique information categories depending on the requirements of the inventory.

The inventory information can be stored and presented in four different formats. The simplest format is a map which would illustrate the distribution and extent of potentially contaminating activities in the municipality (Figure 1). If more detail is required, a list containing addresses organized alphabetically could be used (Table 1). For larger lists, a computer database management system could be used to store information and search the inventory. Finally, the most complex format is a geographic information system containing layers of information on digitized maps.

Figure 1. Historical industrial areas from the City of Toronto's 1949 Official Plan



Address	Years	Company Name	Activity	SIC Code
401 North Street	1998	George's Iron and Steel	Scrap Metal	5919
	1968	George's Iron and Steel	Scrap Metal	5919
	1967	ABC Motor Sales	Motor Vehicle Repair Shop	6359
	1936	ABC Service Station	Gasoline Service Station	6331
	1917	ABC Junk Yard	Scrap Metal	5919
	1910	Residence		

Table 1. Example of a simple table inventory based on the Historical Land Use Database developed by the Environmental Protection Office, City of Toronto.

Collecting the Information

In creating a historical land use inventory, the project team noted that the collection of information is the most time consuming step and one most fraught with potential for problems. At this stage, the efficiency of information collection can be maximized and problems minimized by having taken care previously to define the inventory's scope. There are other ways to maximize collection efficiency. One is to start in the present and work backwards. Sites' street addresses often change. Working from the present backwards, will help flag such changes. Another way is to find a recent map, such as a city base map. Maps of all kinds are useful in that they help visualize the areas being analyzed.

There is a great number and variety of sources of information. It is important to remember that in most cases the sources were originally designed for purposes other than to document the location of potentially contaminated sites. This fact can make their use time consuming and frustrating. In choosing which sources to use, the municipality can select them according to the criteria of ease of use, reliability, comprehensiveness over time and space, and applicability to the information requirements of the inventory.

The information sources have been organized into five categories: municipal, provincial, historical, environmental and rural. For the simplest of inventories, municipal sources such as official plans, zoning by-laws, assessment roles, building permits, and aerial photographs may provide the required information. Such sources should be readily available to municipalities. Provincial sources of information in Ontario include inventories that contain that contain location and other information about underground storage tanks, waste disposal sites, PCB storage sites and coal gasification plants and related industries sites. These Provincial sources are relatively easy to use since they were designed to locate potentially contaminated sites. Moreover, they document some of the most environmentally hazardous sites.

While municipal and provincial sources may be readily available, historical sources must be used to determine any comprehensive history of land uses. Some of the most useful and easy to use sources of information are historical maps including fire insurance plans, land use atlases, and historical atlases. For instance, among other types of information, fire insurance plans indicate the location of hazardous and inflammable building uses, uses which often signal potential contamination. Unfortunately, many plans were destroyed as insurance coverage lapsed or new uses on sites required that new fire insurance plans be made. The various types of atlases have the benefit of being more comprehensive in their coverage, but also have less useful information.

Compared to the map based historical sources listed above, municipal directories are more comprehensive both with the respect to areas, and especially the time periods covered. They are divided into sections including lists of occupants by street, and by business categories. However, using directories brings with it two drawbacks: they are time consuming to use and since they do not include maps their information can be difficult to interpret.

Other historical sources include industrial directories, title searches, Statistics Canada annual reports, county histories, histories by local historical societies, and interviews with long-time residents and municipal employees.

Environmental sources of information include various maps, surveys and reports produced by provincial government ministries such as the Ministries of Agriculture, Natural Resources, and Environment and Energy. The information addresses environmental features such as soil type, ground water vulnerability, vegetation type, water courses, marshes, and sensitive habitats.

In the past, development that has occurred in rural areas or villages is often not covered by historical sources such as fire insurance plans and municipal directories. Sources of information that do cover rural areas include past topographic maps, county histories and historical atlases, and inventories of abandoned pits, quarries and mines. Moreover, interviews with knowledgeable people such as long-term residents, and civic employees might also be conducted to help provide information not available from other sources.

Maintenance

Developing a complete historical land use inventory is an ongoing process requiring updates as more information becomes available. Even if the inventory is complete, changes to it may become necessary. For instance, an entry might be modified or even removed once a site has been redeveloped. The inventory might be expanded to include new categories, other industries or other hazards including unstable slopes and flood plains. It is likely the inventory will contain information gaps that can be filled in over time as new information becomes available. This means that resources should be dedicated to maintaining the inventory.

Conclusions

Municipalities that have identified potentially contaminated sites will be better able to plan for intensification and redevelopment of their brownfields sites. In the long run, most areas of a city will be redeveloped. Having an up-to-date inventory of potentially contaminated sites can only serve to improve the efficiency of the redevelopment process and avoid expensive and disappointing surprises.

Historical land use that may have caused contamination of soil and ground water is only one of the environmental issues facing municipalities. Many of these issues are perhaps best addressed by municipalities that can provide local perspectives and approaches which lead to the most appropriate solutions. The variation and heterogeneity of the natural environment necessitates a local ecosystem approach to defining and solving these environmental issues. A local ecosystem approach will require decisions based on a wide variety of information not only on potentially contaminated sites but also on air and water quality, habitat, wetlands, wildlife, archaeological resources, water courses, groundwater, and other aspects of the natural environment.

An inventory of historical land uses can be a first step to more comprehensive environmental inventories that will provide information vital to the ecosystem approach and to planning for sustainability. The *Historical Land Use Inventories: A Guide for Ontario Municipalities* provides direction for creating part of the foundation on which sustainable communities can be built. Knowledge of the past is essential to building safe and enduring communities for the future.

REFERENCES

- Blair, Pamela. 1996.
The Economics of Urban Form. Prepared for the GTA Task Force. Berridge, Lewenberg and Greenberg.
- Ontario Ministry of the Environment. 1987.
Leas Avenue Hydrogeologic Study (Draft Report). Prepared by Intera Technologies Limited.
- Pachlka, Robert. 1991.
Environmental Effects of Urban Intensification. Prepared for the Ministry of Municipal Affairs, Municipal Planning Policy Branch.
- Paul Eichenger. 1994.
Projects Engineer, Department of Public Works, City of Waterloo. Personal communication. June 6, 1994.
- Waters, R. & Fitchko, J.. 1996.
Soil sample removal and Subsequent Cleanup Methodology and Verification for the Industrial Lot (Block 78) in Pickering. A Final Report Prepared for Falcon Automotive Limited.

Reclamation and Restoration of Settled Landscapes

September 27th – 30th, 1998
Markham, Ontario

PROCEEDINGS

Hosted by the

SOCIETY FOR ECOLOGICAL RESTORATION
Ontario Chapter

and the

CANADIAN LAND RECLAMATION ASSOCIATION

in conjunction with the
CLRA 23rd ANNUAL MEETING

Reclamation and Restoration of Settled Landscapes

September 27th – 30th, 1998
Markham, Ontario

PROCEEDINGS

Hosted by the

SOCIETY FOR ECOLOGICAL RESTORATION
Ontario Chapter

and the

CANADIAN LAND RECLAMATION ASSOCIATION

in conjunction with the
CLRA 23rd ANNUAL MEETING

Canadian Land Reclamation Association
Box 61047, Kensington P.O.
Calgary, Alberta
T2N 4S6

Society for Ecological Restoration, Ontario Chapter
Environmental and Resource Studies Program
Trent University
Peterborough, Ontario K9J 7B8

Reclamation and Restoration of Settled Landscapes

September 27th – 30th, 1998

Markham, Ontario

The report may be cited as;

Reclamation and Restoration of Settled Landscapes, 1998. Proceedings of the 23rd Annual Meeting, Canadian Land Reclamation Association in association with the Society for Ecological Restoration Ontario Chapter, Markham, Ontario.

ACKNOWLEDGEMENTS

The Society for Ecological Restoration Ontario Chapter and the Canadian Land Reclamation Association would like to acknowledge the assistance of Sir Sandford Fleming College in the production of these proceedings.

The Associations would also like to thank the companies and associations that generously sponsored the conference:

Aggregate Producers' Association of Ontario
Aquaphyte Remediation
Beak International
Dufferin Aggregates
Environment Canada
Ecological Services Group
J.C. Duff Limited Sand and Gravel
Harrington and Hoyle Ltd.
Lafarge Canada Inc.
MacNaughton Hermesen Britton Clarkson Planning Limited
Planning and Engineering Initiatives
S.E. Yundt Ltd.
Skelton Brumwell & Assoc. Inc.

TABLE OF CONTENTS

- An Ecosystem Approach to Management: A Context for Restoration and Reclamation**
Gray, P.
- Abandoned Pit and Quarry Sites: Living Experiments**
Browning, M.
- The Revegetation of Drastically Disturbed Lands**
Mrena, C.
- Caledon Creek and Credit River Subwatersheds – A Case Study**
Breton, H.
- Community Involvement in Reclamation and Urban Ecology Restoration**
Napier, D.
- Managing for Natural and Cultural Heritage at Red Cloud Cemetery Prairie**
Lamb, L.
- The Alex Wilson Community Garden**
Johnson, L.
- Naturalization of Landscaped Parkland at Ontario Hydro's Nanticoke Generating Station**
McKenna, G.
- Sensitive Indicators of Urban Stresses in Hardwood Forests along a Toronto-Peterborough Urban-Rural Corridor**
Hutchinson, T. and Sager, E.
- Penetanguishene Harbour Shore Habitat Restoration & Monitoring**
Crispin, S., Dougan, J., Portt, C., Dimock, C., Sherman, K.
- The Influence of Cyanobacterial Amendments on Soil Aggregate Size, Soil Nitrogen Content and Seedling Establishment in a Gravel Pit**
Casper, D., Maxwell, C. D., Browning, M.
- Historical Land Use Inventories: A Guide to Their Creation**
MacRitchie, S. and Block, D.
- The Utility of Aggregate Processing Fines in the Rehabilitation of Dolomite Quarries**
Fraser, J. and McBride, R. A.
- Rapid Ecological Inventories for Ecological Restoration of Industrial Lands**
Murphy, S., Michalenko, G., Whitfield, J., Lamb, L., Suffling, R.
- Landscape Ecology Approaches to the Sustainable Management of Mineral Aggregate Resources, Oak Ridges Moraine, Ontario, Canada**
Fraser, J.
- Ecological Restoration of Meadowlily Woods**
Kraus, D., Dowsley, B. J., Hilditch, T. W., Knutson, R.

The Rehabilitation of the Glenridge Quarry Landfill Site

Girt, S. L. and Smith, D.G.

Mitigating Impacts of Sewer Construction through Wetland Restoration and Habitat Creation: The Devils Creek Trunk Sewer Project

Fausto, J., Mainguy, S., Pastrik, E., Patel, K., Bandoni, F.

Toward a Predictive Model for Naturalization of Aggregate Pits on the Oak Ridges Moraine

Dance, K. and Browning, M.

Brant Prairie: Union Gas Customer Service Centre, Brantford, Ontario

Hensel, M. and Thompson, J.

Lessons Learned for Ecological Rehabilitation from an Investigation of the Regional Municipality of Waterloo, Ontario

Quon, S.

Reconfiguration of Westside Creek and Marsh, Bowmanville

Taylor, S.

Rehabilitation of Dufferin Aggregates' Milton Quarry

Zimmerman, K., Lowe, S., Carbone, S.

Practical Considerations and Lessons Learned in the Reclamation/Restoration of Habitat as a Component of Site Development

Wynia, M. and Jones, C.

Aggregate Supply Trends and Reclamation Opportunities

Parkin, J.

Control of the Invasive Dog-strangling Vine *Cynanchum rossicum*

Smith, S.

Development of a Native Plant Prescription for Urban Hydro Rights of Way

Suffling, R., Lamb, L., Murphy, S.

A System for Urban Wildlife Habitat Restoration

Buchanan, M.

Long Term Monitoring of a Wetland Ecotone in Southern Ontario; Implications for Environmental Planning

van de Lande, R. and Eagles, P.

Mount Forest Wetland Sanctuary Project

Smith, D., Bos, A., Hayman, D.

Community Involvement in Reclamation and Urban Ecology Restoration: Over the Fence Project

Porter, J.

Community Involvement in the Restoration of High Park

Harris, C.

Industrial Reclamation: Partnerships Between Industry, Government and Academia - The Role of Graduate Students of Landscape Architecture

Harder, L., Rintoul, F., Hands, D.

Developments Past, Present And Future of Lands Stressed by the Mining Industry

Peters, T. H.

A Test of Plant-Aided Petroleum Hydrocarbon Degradation

Hosler, K., and Drake, E.N.

A Natural Heritage Approach to the Rehabilitation of Southern Ontario's Limestone Quarries

Ursic, K., Ursic, M., Dougan, J.

Management of Abandoned Aggregate Properties Program

McGuckin, C.

An Innovative Approach to Waste Site Management, Treatment and Rehabilitation

Madison, M., Lanier, A., Shrive, C.

Pipeline Reclamation Criteria Development in Alberta

Fedkenheuer, A. and Burke, J.

The Don Valley Brickworks: Transformation to a City of Toronto Park

Bosco, T.