FCM FEDERATION OF CANADIAN MUNICIPALITIES   FÉDÉRATION CANADIENNE DES MUNICIPALITÉS

Green Municipal **Fund**

10-step guide to developing a municipal brownfield inventory

Leadership in Brownfield Renewal Program
Guidebook Series

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NOTE: This document must not be regarded as a formal legal interpretation. Please refer to any identified legislation or regulations for complete details on legislative and regulatory requirements, and seek legal advice if necessary.

Table of contents

About this guidebook

This guidebook outlines 10 steps that will help you determine the purpose and scope of your municipal brownfield inventory and decide how to populate and manage it. The guide provides an overview of basic concepts, describes how a brownfield inventory can support your municipal policy and planning objectives, and offers recommendations on how to develop your inventory and keep it up to date. It also includes a series of examples from municipalities across Canada.

The guidebook is part of a series developed for FCM's Leadership in Brownfield Renewal Program (LiBRe) program. Based on a seven-step best practice framework, the program aims to help municipalities become better facilitators of the brownfield redevelopment process.

Developing and maintaining a brownfield inventory is a key component of the second step of the framework: "Understand the landscape." The other two key components are determining your regulatory obligations and policy options, and identifying local brownfield stakeholders (e.g. landowners, developers, contractors). FCM's Brownfield Roadmaps will provide useful guidance on these topics.

FCM will continue to produce a range of resources associated with each step of the LiBRe framework over the coming years. You can consult the resources produced to date by visiting www.fcm.ca/libre.

LiBRe Best Practices Framework

Commit to action
Raise awareness and secure a formal municipal commitment to support brownfield redevelopment
❯ Read the guidebook

Understand the landscape
Conduct a detailed analysis of brownfield sites and the local context

Build partnerships
Build relationships with key brownfield stakeholders

Devise a strategy
Develop a formal policy and programs for facilitating brownfield redevelopment
❯ Read the guidebook

Promote programs and opportunities
Build awareness of brownfield issues, programs and redevelopment opportunities
❯ Read the guidebook

Manage programs and projects
Foster the redevelopment of local brownfield sites

Evaluate, improve and celebrate
Assess and improve brownfield redevelopment policies, programs and processes, and celebrate success

Why develop a brownfield inventory?

A brownfield inventory details a site's location and ownership, physical characteristics, land use, redevelopment potential and environmental conditions. Taking stock of the brownfield sites in your municipality will help you take a more strategic approach to encouraging their redevelopment: you will be able to focus your efforts on high priority sites, areas of concern or specific brownfield types (e.g. former gas stations).

> A **brownfield** is defined as an abandoned, vacant, derelict or underused commercial, industrial or institutional property where past actions have resulted in actual or perceived contamination or threats to public health and safety, and where there is active potential for redevelopment.

You can use your brownfield inventory to support basic tasks, such as site monitoring or environmental liability reporting, or to perform more complex tasks, such as reviewing and approving development and building permits, planning capital projects or tracking your brownfield programs. Given the sensitive information a brownfield inventory contains, it can be restricted for internal uses only, or made publicly available under certain conditions.

Conducting and maintaining a brownfield inventory is often resource intensive. It is therefore important to choose an approach that suits your municipality's needs and budget. Follow the 10 steps outlined below to develop a brownfield inventory that will work well for your municipality.

10 steps to developing a municipal brownfield inventory

STEP 1	Determine the purpose of your brownfield inventory	**STEP 6**	Determine the data sources you will use to populate the inventory
STEP 2	Determine who will need to access the inventory	**STEP 7**	Determine the system you will use to store the data
STEP 3	Determine who will create and maintain the inventory	**STEP 8**	Determine how the data will be retrieved and secured
STEP 4	Determine the type of sites to include in the inventory	**STEP 9**	Determine how data quality will be assessed and controlled
STEP 5	Determine what data fields to include in the inventory	**STEP 10**	Determine how the inventory will be maintained

STEP 1
Determine the purpose of your brownfield inventory

To ensure that your brownfield inventory meets end user needs, you should understand who will be using the data and for what purposes. To do so, consult the municipal departments that could potentially make use of the data in the inventory (e.g. environment, planning, engineering, real estate, finance). If the inventory will be publicly available, you could also consult with developers, consultants and the public to determine their data needs.

Once you have conducted these consultations, you can prioritize the list of needs and possible uses identified by prospective inventory users, and determine the main purposes of your inventory.

Potential inventory uses could include:

- **Site monitoring:** Tracking the location, changes in ownership, extent of cleanup activities undertaken, or any issues (e.g. vandalism) or inquiries associated with a site.

- **Site redevelopment prioritization:** Identifying areas in need of revitalization, as well as specific properties that are a redevelopment priority or pose environmental or liability concerns, such as those located in sensitive or highly visible areas (e.g. in the downtown core, in close proximity to schools or hospitals).

- **Planning:** Developing land use plans, economic development plans, brownfield strategies and programs that target priority sites, neighbourhoods and/or specific types of brownfields.

- **Data retrieval/sharing:** Facilitating information sharing with other municipal departments, other orders of government and the public.

- **Supporting municipal brownfield programs:** Managing and reporting on your brownfield programs by tracking inquiries, disbursements and redevelopment success stories.

- **Marketing and outreach:** Developing materials to market available properties to prospective purchasers and provide key information that would be of interest to them (e.g. available funding programs, environmental condition of the site, investigations and cleanup activities carried out to date, information about neighbouring property uses).

- **Streamlining the redevelopment process:** Ensuring that the best possible information is available early in the development process to inform site design concepts and assist prospective purchasers or developers with environmental due diligence.

- **Liability reporting:** Quantifying and reporting on liability estimates for the remediation of contaminated sites to comply with Section PS 3260 of the Canada Public Sector Accounting Handbook (see text box on page 5 for more information).

- **Managing risk and liability:** Managing potential civil, legal and reputational liabilities that can arise from contaminated sites, reducing health risks to workers and residents, and providing important information to development stakeholders to enable them to better manage their business risks.

Funding, resource availability and other factors determined in subsequent steps will help you identify and prioritize the final purposes of your inventory.

STEP 1 CHECKLIST
What is the purpose of the inventory?

- ☐ Consult with municipal departments to determine their brownfield information needs.

- ☐ If some aspect of the inventory will be publicly available, consult with relevant stakeholders to determine their information needs.

- ☐ Based on information gathered, determine the desired uses for the brownfield inventory:

  - ☐ Site monitoring and tracking

  - ☐ Site redevelopment prioritization

  - ☐ Planning

  - ☐ Data retrieval/sharing

  - ☐ Supporting municipal brownfield programs

  - ☐ Marketing and outreach

  - ☐ Streamlining the redevelopment process

  - ☐ Liability reporting

  - ☐ Managing risk and liability

  - ☐ Other _____

Liability reporting for contaminated sites

Section PS 3260 of the **Canada Public Sector Accounting Handbook** of Chartered Professional Accountants Canada, "Liability for Contaminated Sites," contains standards for how municipalities should account for and report on liabilities associated with the remediation of contaminated sites for which they are responsible. It establishes when to recognize and how to measure a liability for remediation. A liability generally results from contamination at sites that are no longer in productive use or contamination arising from an unexpected event, such as a spill.

To determine the liability potential of a property, the following process should be considered:

1. Collect basic site information for each property (e.g. in an inventory).

2. Conduct an environmental screening assessment for each property to determine if it may be contaminated. A property's status as a potential brownfield can sometimes be easily ruled out at this stage.

3. For properties identified as potential brownfields, assess their environmental condition by conducting desktop reviews of readily accessible environmental data (Phase 1 environmental site assessment).

4. Evaluate the potential environmental risks for each property, identifying known or potential issues of environmental concern that may be present.

5. As appropriate, identify properties where additional site assessment (Phase II environmental site assessment), including the collection and analysis of soil and/or groundwater samples, is necessary to assess whether an actual issue exists and whether further efforts are required.

6. Develop a site-specific preliminary action plan for each property where there is a known or potential issue of environmental concern. Using that action plan, a reasonable "worst case" estimate of the remediation cost may be prepared. As further information becomes available, that estimate can be further refined.

7. Determine the municipality's aggregate liability for the purposes of PS 3260 reporting by summing the estimated remediation costs across the entire portfolio of municipal properties.

STEP 2
Determine who will need to access the inventory

The consultations conducted in Step 1 will reveal who within your organization will require direct, ongoing access to the inventory and who only needs information periodically. At this point, you can also determine whether you will allow public access to the data in the inventory, either by request or on demand.

The following table will help you track the information requirements of municipal departments and external stakeholders.

Potential user	Direct, ongoing access	Access upon request	No access
Municipal department #1 _____ (add dept. name)	☐	☐	☐
Municipal department #2 _____ (add dept. name)	☐	☐	☐
Municipal department #3 _____ (add dept. name)	☐	☐	☐
Developers	☐	☐	☐
Consultants	☐	☐	☐
General public	☐	☐	☐
Other _____	☐	☐	☐

An important consideration in this step is the security of sensitive data. Identifying a site as a brownfield can have a negative effect on the property value. For this reason, many private owners are reluctant to voluntarily disclose information about the environmental condition of their properties. To help alleviate these concerns, some municipalities will restrict access to inventory data.[1] In other cases, they avoid using the terms "brownfield" or "contaminated sites" altogether, choosing more positive descriptions such as "redevelopment opportunities" instead. If the inventory is to be shared with external stakeholders, appropriate access restrictions must be put in place. These are discussed in more detail in Step 8.

> ☑ **STEP 2 CHECKLIST**
> **Who will need to access the inventory?**
>
> ☐ Determine the type of access required by completing the table above.

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[1] Note that, despite the restrictions placed on access to the inventory, provincial and territorial freedom of information/access to information legislation may still require that municipalities disclose this type of information if requested.

STEP 3
Determine who will create and maintain the inventory

If different municipal departments will be involved in creating, using and updating the inventory, you will need to clearly identify their respective roles and responsibilities, and determine who will fund the inventory's development and maintenance. Generally, having only one or two individuals responsible for inputting and updating data will ensure that the inventory is secure, accurate and up to date.

Depending on the expertise and availability of municipal resources, your inventory could be developed by municipal staff, contract employees or external consultants. As discussed further in Step 8, additional security measures will need to be put in place if contract employees or consultants have access to data.

☑ STEP 3 CHECKLIST
Who will create and maintain the inventory?

- ☐ Select the municipal department and individuals that will lead the inventory's development and maintenance.

- ☐ Identify the funding source(s) for the inventory's development and maintenance.

- ☐ Determine if the inventory will be developed in-house or using external resources.

STEP 4

Determine the type of sites to include in the inventory

The types of sites you should include in your inventory will depend on the uses you identified in Step 1. If the main objective of the inventory will be to support internal municipal operations or liability reporting requirements, you could focus exclusively on municipally owned properties. However, if you plan on using your inventory for purposes such as encouraging redevelopment regardless of ownership, you will want to include non–municipally owned sites as well.

Beyond site ownership, additional screening criteria include:

❯ Sites with suspected contamination (based on known uses at the site or a Phase I site assessment)

❯ Sites with known contamination (based on a Phase II site assessment)

❯ Underused or non-productive sites (i.e. those that are not being productively used, not generating income or not being used for intended purpose)

❯ Productive sites where remediation work is being performed

Assessing brownfield sites

To confirm the presence of contamination, environmental site assessments are performed in phases, with more detailed information collected in each progressive phase:

❯ **Phase I environmental site assessment*:** A preliminary assessment evaluating current and historical land uses or activities, potential areas of contamination, and surrounding land uses or activities.

❯ **Phase II environmental site assessment*:** A preliminary assessment in which field samples are analyzed to determine contaminant types and concentrations.

❯ **Detailed or delineation environmental site assessment*:** A more detailed assessment, if required, to confirm contaminant types/ concentrations and delineate contaminated areas.

(*Note: The terminology used to describe each phase of the site assessment process varies among provinces.)

☑ STEP 4 CHECKLIST
What type of sites will be included in the inventory?

☐ Select the types of sites to be included in the inventory.

Ownership:

☐ Municipally owned sites

☐ Non–municipally owned sites

☐ Abandoned sites

Other criteria:

☐ Sites with suspected contamination

☐ Sites with known contamination

☐ Underused sites or non-productive sites

☐ Productive sites where remediation work is being performed

STEP 5
Determine what data fields to include in the inventory

The decisions taken in the previous steps will dictate what type of information to include in your inventory. Choose from the data fields suggested below to create an inventory that will suit your municipality's needs. This should be considered a preliminary wish list, as the availability of data and resources will affect what information is ultimately included in an inventory.
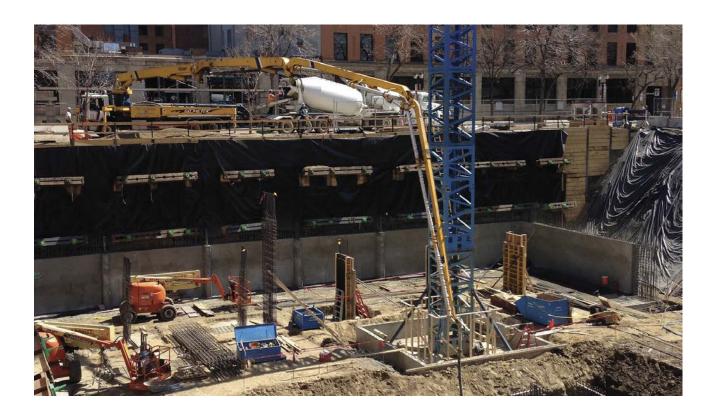
Remember that the more data fields you include, the more robust and useful a tool your inventory will be, but the more onerous it will be to populate and maintain it. To strike the right balance, keep the inventory's end goal in mind when selecting your data fields and limit your choices to the minimum required to perform the desired tasks.

If, for example, your inventory will be solely used to support basic tasks, such as environmental liability reporting, you may want to limit the data fields to the "Basic data" column in the table on page 10. If you will use your inventory for more complex tasks, such as planning exercises, marketing properties or tracking your brownfield programs, you may want to select additional fields from the "Advanced data" column.

☑ **STEP 5 CHECKLIST**
What data fields will be included in the inventory?

☐ Select the data fields to be included in the inventory by completing the table on the next page.

Potential data fields

BASIC DATA	ADVANCED DATA

Site location/identification

BASIC DATA	ADVANCED DATA
☐ Address ☐ UTM coordinates ☐ Legal description ☐ Identification number from other inventories (e.g. provincial registries)	☐ Current owners ☐ Past owners ☐ Tax roll number ☐ Nearest major intersection

Physical characteristics

BASIC DATA	ADVANCED DATA
☐ Presence, age and condition of structures on property	☐ Survey plan ☐ Photographs ☐ Property features/amenities ☐ Servicing information ☐ Frontage ☐ Access to utilities or transportation infrastructure ☐ Building plans ☐ Map and aerial photos ☐ Other site configuration information

Land use

BASIC DATA	ADVANCED DATA
☐ Zoning	☐ Current property use (with dates) ☐ Previous property use (with dates) ☐ Neighbouring property uses

Redevelopment potential and status

BASIC DATA	ADVANCED DATA
☐ Redevelopment status (e.g. vacant, site plan submitted/approved, building permits, construction in progress, occupancy approved) ☐ Redevelopment plans	☐ Indication of site suitability for redevelopment ☐ Property value ☐ Tax status ☐ Property availability ☐ Municipal interest/vision ☐ Applicable brownfield incentives ☐ Applicable municipal policies ☐ Existing liens on property ☐ Property tax assessment

Environmental conditions

BASIC DATA	ADVANCED DATA
☐ Environmental status and remedial activities performed to date (e.g. unassessed, under assessment, proven clean, requires remediation, under remediation, remediation complete) ☐ Descriptions of ongoing environmental management activities	☐ Status of site assessments performed on the site and links to assessment documentation ☐ Status of remedial action plans and links to remedial planning documents ☐ Types of environmental media affected (e.g. soil, groundwater, sediment, soil vapour) ☐ Contaminants of concern ☐ Status of designated substances (confirmed presence/absence, suspected presence) ☐ Presence of underground/aboveground storage tanks ☐ Regulatory orders/certificates ☐ Cost estimates of remaining clean-up activities ☐ Bylaw infractions ☐ Proximity to vulnerable aquifers, surface water bodies or other environmentally sensitive areas ☐ Property title restrictions (e.g. institutional controls to minimize human exposure to contamination) ☐ Presence or absence of potential habitat for species of interest

Other information

BASIC DATA	ADVANCED DATA
☐ Environmental liability estimate and supporting documentation ☐ Contact information for municipal representative responsible for the site	☐ Presence of sensitive populations in the vicinity (e.g. nursing homes, schools, hospitals)

STEP 6
Determine the data sources you will use to populate the inventory

You can draw on a variety of sources to populate your inventory, including provincial, federal and private sector databases; municipal tax roll data; and aerial photographs.

Provincial, federal and private sector databases

Some territorial or provincial environmental legislation requires the creation of a registry specific to contaminated sites. The following is a list of these registries and databases:

- Ontario – Environmental Site Registry
- Alberta – Environmental Site Assessment Repository
- New Brunswick – Property-Based Environmental Information Program
- Quebec – Répertoire des terrains contaminés (in French only)
- British Columbia – Site Registry
- Manitoba – Sites Lists
- Newfoundland and Labrador – Environmental Sites Database
- Prince Edward Island – Contaminated Sites Registry

As part of the Federal Contaminated Sites Action Plan, the federal government maintains the Federal Contaminated Sites Inventory, a database of contaminated sites for which the federal government is responsible.

Some private sector companies also maintain environmental registries and databases, and provide the data for a fee.

If you are obtaining data from existing municipal electronic databases (e.g. licence, permit and property tax information), you should explore options to link your inventory to those databases to reduce the time and resources required for data input and updates. This will also reduce the risk of input errors.

Other data sources

Other useful data sources include:

- **Land title searches** will provide key site information, such as ownership, legal description, easements, encumbrances, liens (e.g. environmental, tax arrears), etc.

- **Municipal permits and licences**, such as building or demolition permits, zoning information, and business licences, can be used to develop a chronology of the site's historic uses and determine whether there is potential for contamination.

- **Municipal tax roll data** and property reports can be used to provide details on the type, size and use of structures on the site.

- **Aerial photographs** can be used to gain an understanding of a property's development history and identify potentially contaminating activities. These photographs can reveal significant features such as storage tanks, old landfills, former building locations or other structures that have been removed or destroyed.

❯ **City street directories** can be used to develop an understanding of the occupancy and uses of a property over time. These directories are typically available from municipal libraries.

❯ **Insurance records**, such as fire insurance plans and property underwriters' reports, can be used to determine general land-use history. In some urban centres, detailed mapping information about historical land uses and buildings, including the locations of businesses and fuel storage tanks, may be available.

❯ **Environmental reports/assessments**, such as Phase I and II environmental site assessments, are often commissioned by or submitted to a municipality as part of various municipal operations (e.g. property management, planning approvals, infrastructure development). These reports can include information on historical and current land uses and areas of environmental concern, as well as information on surrounding properties.

❯ **Site visits** provide useful information on the current condition of a site and its neighbouring properties. They can also help you assess the condition of any structures present and may even enable you to determine the presence of underground storage tanks.

❯ **Public input and local knowledge** can be obtained through interviews with residents, businesses, tenants, municipal employees and others. These can provide important insights into historical and current activities that may be relevant to a property's environmental condition, as well as information about any environmental investigations or remediation that may have been completed.

❯ **Historical land use inventories (HLUI)** have been developed by some municipalities to collect information on the type and location of land uses within the municipality. The information in these inventories can be used as a screening tool to identify sites that may be contaminated as a result of past or present land uses. An HLUI typically uses Canadian Standard Industrial Classification codes to describe the activities conducted on a property. Based on the industries associated with these codes, potential contamination can be determined. It is important to note that HLUIs are not brownfield inventories, and the inclusion of a property in the HLUI does not necessarily mean that the property is contaminated or underused.

☑ STEP 6 CHECKLIST
What data sources will be used to populate the inventory?

☐ Select the data sources to be used to populate your inventory:
- ☐ Provincial and federal environmental databases
- ☐ Private sector databases
- ☐ Land title searches
- ☐ Municipal permits/licences
- ☐ Municipal tax roll data
- ☐ Aerial photographs
- ☐ City street directories
- ☐ Insurance records
- ☐ Environmental reports/assessments
- ☐ Site visits
- ☐ Public input/local knowledge
- ☐ Historical land-use inventories

☐ Assess how easy it will be to obtain the selected data sources, and whether it is possible to automatically populate and update your inventory by linking it to electronic databases.

STEP 7
Determine the system you will use to store the data

Once you have chosen the data fields and sources for your inventory, you must decide how to store your data. Three options are outlined below.

❯ Hard copy files

This is the least flexible format, but the simplest to implement. Use this format if:

- ❯ The inventory will include a limited number of data fields and/or sites (i.e. within a small geographic area or related to some specific property uses).

- ❯ Your municipality has limited financial and/or human resources.

- ❯ Only a few people will make use of the inventory.

- ❯ The inventory will not draw data from other databases.

❯ Electronic spreadsheets and databases

This format requires more time and resources to design, but ultimately saves time when querying, reporting and updating information. Use this format if:

- ❯ The inventory will include a large number of properties and/or data fields.

- ❯ Your municipality has sufficient resources to develop and/or purchase a database.

- ❯ You have the support of an information technology team that can help maintain and update the inventory.

- ❯ The inventory will support the municipal operations in multiple departments.

- ❯ The inventory will link with other databases used to manage municipal operations (e.g. licensing, permitting).

Kansas State University has developed the Brownfield Inventory Tool (BIT), a free online system that allows you to enter detailed site data, upload documents and data, and generate and export a variety of reports, including a Property Profile Form. To use the BIT system, you have to create a user name and password for privacy protection. BIT can also be used as a collaborative tool; specific inventory data can be accessed by multiple users if permission by the primary user is granted.

Database with Geographical Information System or mapping capabilities

This is one of the more complex and expensive types of brownfield inventory, but also the one that provides the most value in terms of spatial analysis. Use this format if:

- The above conditions for electronic spreadsheets and databases apply.

- Your municipality covers a large geographic area.

- Your municipality has the ability to purchase Geographical Information System (GIS) software and the expertise to develop and maintain the GIS mapping aspects of the database.

☑ STEP 7 CHECKLIST
What system will be used to store the data?

- ☐ Select the method(s) to be used to store inventory data:
    - ☐ Hard copy files
    - ☐ Electronic spreadsheets and databases
    - ☐ Database with Geographical Information System/mapping capabilities
- ☐ If a database method is selected, explore database software options and select the most suitable option.

STEP 8

Determine how the data will be retrieved and secured

As mentioned in Step 2, property owners may be reluctant to have contaminated site information disclosed in a publicly accessible inventory because it could negatively affect property values. For this reason, some municipalities allow only municipal staff to access the inventory, while others make only select data publicly available. However, be aware that, despite the restrictions placed on access to the inventory, provincial and territorial freedom of information/access to information legislation may still require that municipalities disclose this type of information upon request.

If inventory data is to be shared with external stakeholders, appropriate access restrictions must be put in place.

In the event that privately owned properties will be included in your inventory, you should seek written permission and obtain some form of liability release from the property owner. Such releases do not act as an admission or recognition of any site contamination. You should seek legal and information security advice to determine what needs to be secured and how to secure it, and to draft a liability release from property owners for the use of the information in the inventory. Note that a property owner may choose to provide site information only if there is some obligation or commercial incentive to do so, such as attracting potential contractors and developers or accessing grant resources to facilitate redevelopment.

If information is being extracted from other municipal sources (e.g. land title searches, municipal permits/licences, municipal tax roll data, insurance records, environmental reports/assessments), and that information is not in the public realm, it is necessary to obtain consent to include it in the inventory.

Some options and considerations for inventory access are outlined in the table below.

Inventory access options	Considerations
Online inventory with all information publicly accessible	• Do not include any sensitive or confidential information.
Online inventory with limited information publicly accessible	• Do not release protected or sensitive information to the public.
Internal inventory with information available to the public upon request	• Only designated municipal staff should have access to the inventory. • Designated staff must protect sensitive information and must know what information can and cannot be released to the public. • The public or municipal staff without access must formally request information from the designated staff, who will assess these requests and determine what information can be released.
Internal inventory with limited access to specific municipal staff	• Only designated staff have access to the database.

- Select access option for the inventory:
    - Online inventory with all information publicly accessible.
    - Online inventory with limited information publicly accessible.
    - Internal inventory with information available to the public upon request.
    - Internal inventory with limited access to specific municipal staff.
- Based on access type, determine the appropriate inventory access restrictions for the inventory as a whole and/or for specific parts of the inventory.
- Seek information security expertise to determine options for data security.
- If non-municipal sites are included in the inventory:
    - Explore ways to assure property owners that sensitive data are secure.
    - Determine if incentives or bylaw requirements are required to encourage property owners to provide data.
    - Seek legal advice to develop a process for seeking site information from the property owner, and obtaining a liability release, to include the information in the inventory.
    - Seek permission from property owners for information that will be made publicly available.

STEP 9
Determine how data quality will be assessed and controlled

Developing a quality management system will help you keep your inventory data accurate and up to date. Your quality management system should ensure that:

❯ **The data being entered from other sources is accurate** – Data originating from municipal departments, other government entities, or commercial data providers will likely have gone through a rigorous quality control system. However, it is a good idea to verify these quality controls before pulling the data into your brownfield inventory. If your inventory links directly to other databases, you will need to periodically ensure that these links are working.

❯ **Errors do not occur when data is inputted or updated** – This verification can be performed by having one person responsible for inputting or updating data, and another responsible for double checking data accuracy.

❯ **Errors do not occur when data is obtained from the system** – This verification can be performed by regularly extracting information from the system.

❯ **There is no breach of the data security systems** – This verification can be performed by regularly testing the security of the inventory and the data it contains. Information technology security experts can assist with performing these tests.

☑ **STEP 9 CHECKLIST**
How will data quality be assessed and controlled?

☐ Determine the quality management requirements for your inventory.

☐ Develop quality control methods to ensure the accuracy of data when it is inputted, updated or extracted from the inventory.

☐ Assess the quality control systems used for data obtained from external sources.

☐ Have an IT security expert implement a data security verification system.

☐ Document the quality management system for the inventory.

STEP 10

Determine how the inventory will be maintained

Once you have developed your inventory, you will need to maintain and regularly update it so that it remains relevant and useful. This will require time and resources — be sure to take this into account in the planning stage.

You should also periodically re-evaluate your inventory's design and content to determine whether changes or upgrades are required. Monitoring usage and collecting feedback from users can provide information on any changes and updates that may be needed.

Inventory maintenance should involve the following:

> **Develop a maintenance plan and schedule** that identifies the individuals who will be responsible for the maintenance.

> **Determine resource requirements** for adding new data to the inventory as it becomes available and periodically reviewing existing data and links to external data sources.

> **Collect statistics and feedback on inventory use** to assess its performance.

> **Periodically reassess your inventory format,** using the performance data, to determine if changes are required to the inventory format and design (e.g. need to move from hard copy files to electronic spreadsheets, new data sources or data fields).

> **Perform regular maintenance and updates** in accordance with your maintenance plan and the results of periodic performance reviews.

☑ STEP 10 CHECKLIST
How will the inventory be maintained?

☐ Develop a maintenance plan and schedule.

☐ Determine resource requirements.

☐ Collect inventory performance data.

☐ Periodically reassess inventory format.

☐ Perform regular maintenance and updates.

Application of the 10 steps:

Municipal examples from across Canada

The following examples show how various Canadian municipalities have applied the 10 steps described in the previous section. Draw on these examples to devise your own approach to conducting and maintaining a brownfield inventory.

City of Nanaimo, BC	
General description	This database of city-owned brownfield sites is intended for internal use only.
STEP 1 – Use/purpose	• Liability reporting • Site redevelopment prioritization
STEP 2 – Access	• Users are city staff in the following departments: finance (liability reporting), planning (development issues), public works (utility and road projects) and real estate (redevelopment of city properties) • Other city employees can request information from the real estate department
STEP 3 – Owner	• Real estate department
STEP 4 – Types of sites included	• City-owned, fee simple parcels and areas of road right-of-way where contamination has been identified
STEP 5 – Data fields included	• Address • Site name • Legal description • Current use • Intended future use • Whether the city is responsible for the remediation • Nature of contamination • Productive or non-productive uses • Remediation plan • Remediation costs • Supporting reports
STEP 6 – Data sources used	• BC Ministry of Environment database • Environmental reports completed for city-owned lands and road rights-of-way
STEP 7 – Data storage system	• Data is stored in a Tempest database system
STEP 8 – Data retrieval/security	• Data is retrieved by accessing the database • Database access restricted to city employees
STEP 9 – Data quality control	• Two staff members add new information and edit when required
STEP 10 – Inventory maintenance	• Updated on an annual basis (for liability reporting requirements) or as new information becomes available
Contact information	**Bill Corsan** Manager, Real Estate City of Nanaimo bill.corsan@nanaimo.ca

City of Vancouver, BC	
General description	This database of city-owned sites is intended for internal use only.
STEP 1 – Use/purpose	Asset management, project planning and liability reporting.
STEP 2 – Access	Access is restricted to Contaminated Sites Team employees and the senior manager.
STEP 3 – Owner	Contaminated Sites Team, Environmental Services.
STEP 4 – Types of sites included	• City-owned sites. • Sites with known or suspected contamination (based on environmental site assessments and past history). • Sites where remediation work is being or has been performed.
STEP 5 – Data fields included	Most information provided in comment text boxes and database is linked to electronic records that contain reports and other site data.
STEP 6 – Data sources used	• Other city databases. • Environmental reports (e.g. environmental site assessments). • BC Ministry of Environment's Site Registry.
STEP 7 – Data storage system	Data stored in a Hanson database system and linked to the "VanMaps" GIS program, which is updated nightly.
STEP 8 – Data retrieval/security	• Data is retrieved by accessing the database. • Database access is restricted to Contaminated Sites Team employees. • The data is password protected. • Other city employees can request information from the Contaminated Sites Team, who will use their discretion on what information to provide.
STEP 9 – Data quality control	There are minimal data entry concerns because the database links to other databases and complete reports are stored as part of the database.
STEP 10 – Inventory maintenance	The Contaminated Sites Team employees perform regular updates and maintenance to the inventory.
Contact information	**Jennifer Mayberry** Manager of Environmental Services City of Vancouver jennifer.mayberry@vancouver.ca

City of Edmonton, AB	
General description	This is a Microsoft Excel spreadsheet that provides a "snapshot in time" of privately owned brownfield sites, using publicly available information.
STEP 1 – Use/purpose	• Managing risk and liability. • Supporting municipal brownfield programs. • Marketing and outreach.
STEP 2 – Access	• The list was part of a discussion paper that was on the city website; the report was later removed from the website and is now only available internally to city employees.
STEP 3 – Owner	• Economic and Environmental Sustainability Branch.
STEP 4 – Types of sites included	• Privately owned brownfield sites, primarily gasoline service stations and former refueling sites.
STEP 5 – Data fields included	• Address • Size • Tax assessment • Zoning
STEP 6 – Data sources used	• Limited historical records review. • Other city databases. • Business licence files. • Site visits.
STEP 7 – Data storage system	• Simple Microsoft Excel spreadsheet.
STEP 8 – Data retrieval/security	• Data is retrieved by accessing the discussion paper and the Excel spreadsheet. • The discussion paper and spreadsheet include a disclaimer.
STEP 9 – Data quality control	• Multiple filters and reviews were performed when information was acquired from source data.
STEP 10 – Inventory maintenance	• Database was a one-time "snapshot"; maintenance is therefore not required.
Contact information	**Barbara Daly** Economic and Environmental Sustainability Department City of Edmonton barbara.daly@edmonton.ca

	City of Oshawa, ON
General description	This is a Historical Land-use Database that was created in the 1990s and intended for internal use only.
STEP 1 – Use/purpose	• A historical-use snapshot that is used to identify potential environmental risks and liability.
STEP 2 – Access	• Access is restricted to city employees.
STEP 3 – Owner	• Planning Services was originally responsible for developing the database, which is a snapshot in time; they continue to hold a copy that is accessible to city staff.
STEP 4 – Types of sites included	• City-owned sites. • Tiered screening process was used to identify municipal properties with known or potential contamination, and to develop corresponding estimates of the associated environmental liability.
STEP 5 – Data fields included	• Address • Owner • Lot area • Roll number • Zoning • Former uses
STEP 6 - Data sources used	• Vernon's directory • Municipal development applications. • Staff knowledge. • Available reports documenting the environmental condition of each property. • Google Earth imagery and other mapping data to compile and document property-specific conditions.
STEP 7 – Data storage system	• Microsoft Access
STEP 8 – Data retrieval/security	• Data is retrieved by accessing the database. • Access is restricted to city employees.
STEP 9 – Data quality control	• Database is a snapshot; there is therefore no need for ongoing quality control.
STEP 10 – Inventory maintenance	• Database is a snapshot; maintenance is therefore not required.
Contact information	**Laura Moebs** City of Oshawa lmoebs@oshawa.ca **Warren Munro** City of Oshawa wmunro@oshawa.ca

	City of Cornwall, ON
General description	Database of city- and privately-owned sites intended for internal use only.
STEP 1 – Use/purpose	• Site monitoring and tracking. • Liability reporting. • Managing risk and liability.
STEP 2 – Access	• Users: infrastructure planning, financial services, economic development. • Access is restricted to city employees. • Public can request information, which would be disseminated by a city employee.
STEP 3 – Owner	• Created by planning department, maintained by engineering department.
STEP 4 – Types of sites included	• City-owned and privately owned sites. • Known derelict and/or potentially contaminated sites within designated Community Improvement Policy Areas based on their association with specific property uses with known potential to result in soil and groundwater contamination (e.g. gas stations, dry cleaners, PCB waste sites, coal tar disposal sites, rail lands).
STEP 5 – Data fields included	• Roll number • Business/owner name • Current street address • Former street address • Frontage • Depth • Area • Zoning class • Photos (yes/no) • Site use description (current and former) • Date (when established) • Decommissioned (yes/no) • Environmental reports completed (e.g. Phase I, II or III environmental site assessments) • Additional (reserved for extra details)
STEP 6 – Data sources used	• Fire insurance plan • City business directory • Municipal tax roll data • Aerial photograph • Environmental reports • Technical Standards and Safety Authority (TSSA) fuel tank inventory • Ontario water well information system
STEP 7 – Data storage system	• GIS System using the MiTown web-based GIS viewer that pulls information from various maps and city databases.
STEP 8 – Data retrieval/security	• Data retrieved by accessing the MiTown interface. • Access to database restricted to city employees.
STEP 9 – Data quality control	• No formal procedure, but the person supplying data to a brownfields layer is assumed to be knowledgeable about the material and has accordingly presented the best data available. • Should the city GIS Analyst (who is the publisher of the MiTown brownfields layer) discover unusual data, the analyst will contact originator of the data for clarification.
STEP 10 – Inventory maintenance	• Annual review of the database completed by the engineering department.
Contact information	**Dana McLean** Planning Program Administrator, City of Cornwall dmclean@cornwall.ca

The path forward

Armed with a brownfield inventory containing up-to-date information about your local brownfield sites, your municipality will be better able to prioritize resources, revitalize neighbourhoods, reduce its corporate liability, prevent health risks to workers and residents, and help development stakeholders better manage their business risks.

By developing a brownfield inventory, you have tackled a major component of the second step of FCM's Leadership in Brownfield Renewal program ("Understand the landscape") and are now ready to take on the next steps:

❯ **Build partnerships:** Build relationships with key brownfield stakeholders.

❯ **Devise a strategy:** Develop a formal policy and programs for facilitating brownfield redevelopment.

❯ **Promote programs and opportunities:** Build awareness of brownfield issues, programs and redevelopment opportunities.

❯ **Manage programs and projects:** Foster the redevelopment of local brownfield sites.

❯ **Evaluate, improve and celebrate:** Assess and improve brownfield redevelopment policies, programs and processes, and celebrate success.

Stay tuned for more resources from FCM's Green Municipal Fund that will help support your progress every step of the way.

Brownfield inventory resources

BDO Canada LLP. Contaminated Sites; A Practical Approach to Section PS 3260, October 31, 2014.

DiFrancesco, R.J.. Brownfields and Planning: A Primer for Architects and Planners. Canada Mortgage and Housing Corporation.

International City/County Management Association (ICMA). GIS and Brownfields; Encouraging Redevelopment, Public Involvement, and Smart Growth – An Executive Briefing for Local Government Officials.

Kansas State University. Brownfield Inventory Tool.

Manitoba Municipal Government. A Guide for the Adoption of PS 3260: Liability for Contaminated Sites. January 2014.

United States Environmental Protection Agency, Petroleum Brownfields: Developing Inventories, EPA 510-R-09-002, May 2009.

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The Government of Canada endowed FCM with $550 million to establish the Green Municipal Fund™. The Fund supports partnerships and leveraging of both public and private-sector funding to reach higher standards of air, water and soil quality, and climate protection.

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