

**GUIDELINE**  
**July 2023**

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**ENVIRONMENTAL SITE ASSESSMENTS IN MANITOBA**

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**1.0 Introduction**

This guideline provides information and direction on the methods and protocols considered acceptable by Environment and Climate (the department) for the environmental assessment of sites where the quality of groundwater, surface water, sediments and/or soil may have been affected by contaminants as result of past or present usage of the site.

This guideline has been developed as a reference document for use by environmental professionals, industry stakeholders, and the general public. The contents of this document include:

- A discussion of the legislation, regulations and guidelines applicable to environmental site assessments (ESAs).
- Procedures for the investigation, characterization and assessment of *contaminated sites* and *impacted sites*.
- A discussion of acceptable reporting standards.

This guideline reflects the principles established by the Canadian Council of Ministers of the Environment (CCME) for the management of sites in Canada and the requirements of the Manitoba Contaminated Sites Remediation Act (CSRA) and the Manitoba Contaminated Sites Remediation Regulation, M.R. 105/97 (CSRR).

This guideline contains revisions to the previously issued guideline entitled *Environmental Site Assessments in Manitoba*, originally issued June 2016.

Although this guideline is not in itself a legally enforceable standard, parts of the document may be referenced in orders issued by the department, which are legally enforceable.

This guideline has been developed by the department to assist stakeholders in understanding the technical and environmental issues associated with sites that may have been affected by contaminants. This guideline is intended to provide environmental professionals with a baseline for conducting ESAs, characterizing sites, and for developing applicable risk-based remediation plans and management plans.

The investigative procedures provided in this document are described in general terms on the assumption that ESAs will be conducted by qualified environmental professionals who are capable of adapting these procedures to deal with site-specific conditions. Any major deviations from this guideline are subject to review by the department prior to their implementation. As a general rule, the department expects the environmental professionals conducting ESAs to apply best practices and use of appropriate methodology for the contaminants being investigated.

## 1.1 Background

The preparation of this guideline included a review of various regulatory approaches to ESAs and risk management. This document was developed specifically for application to the highly variable geographic, geological, and environmental conditions present within Manitoba. One of the purposes of the guideline is to provide a standard approach to ESAs that will ensure that results can be applied consistently within the framework of the CSRA.

## 1.2 Definitions

The following section provides a number of definitions used in this guideline.

**"Contaminant"**, in relation to a site, means any product, substance or organism that is foreign to, or in excess of, the natural constituents of the environment at the site and that:

- a. has affected, is affecting or may affect the natural, physical, chemical or biological quality of the environment, or
- b. is, or is likely to be, injurious or damaging to the health or safety of a person.

**"Contamination"** means the presence in, on, or under, or the permeation or infusion of, soil, sediment, surface water or groundwater of, or by a contaminant.

**"Contaminated Site"** means a site that is contaminated at a level that poses a threat to human health or safety or to the environment and that has been designated as a *contaminated site* under the CSRA.

**"director"** means a director appointed under the authority of the CSRA.

**"Groundwater"** means all water under the surface of the ground.

**"Impacted Site"** means a site that is contaminated at a level that does not currently pose a threat to human health or safety or to the environment, but that may pose such a threat in the future and that has been designated as an *impacted site* under the CSRA.

**"The department"** means Environment and Climate.

“**Remediation**” is defined in the CSRA as the management of a *contaminated site* or an *impacted site* in order to prevent, minimize or mitigate damage to human health or the environment, or to restore all or part of the site to a useful purpose.

## **2.0 Associated Manitoba Legislation and Guidelines**

This guideline is intended to be applied in conjunction with existing Manitoba legislation regarding contaminated sites and impacted sites along with guidelines concerning hazardous waste and chemical storage. Specific guidelines/legislation which may have some relation to this guideline are described in the following sections:

### **2.1 The Contaminated Sites Remediation Act (CSRA) and the Contaminated Sites Remediation Regulation (CSRR)**

The principal purpose of CSRA is to provide for the remediation of contaminated sites and impacted sites, in accordance with the principles of sustainable development, in order to reduce or mitigate the risks of further damage to human health or the environment and, where practicable, to restore such sites to useful purposes.

Further information regarding the processes involved in the designation of contaminated sites and impacted sites is provided in: Guide to the Contaminated Sites Remediation Act (CSRA).

The CSRR provides more detail on how the CSRA is to be administered. The CSRR includes a definition of the acceptable standards for assessing contaminants on a site.

### **2.2 Petroleum Storage Program**

The department maintains records of existing, operating, and decommissioned petroleum storage sites within the Province of Manitoba through the department’s Petroleum Storage Program. Further information regarding the Petroleum Storage Program is provided in: Storage and Handling of Petroleum Products and Allied Products Regulation, M.R. 188/2001.

### **2.3 Hazardous Waste Management Program**

The registration, transportation, and handling of materials classified as Hazardous Waste, is governed by Chapter D12 of the Dangerous Goods Handling and Transportation Act, which is administered by the department.

### **2.4 Petroleum Contaminated Soil Treatment/Disposal**

The department regulates the end use of petroleum contaminated soil, depending upon the nature and degree of severity of petroleum contamination. More information regarding the disposal of petroleum contaminated soil is provided in the department guideline *Treatment and Disposal of Petroleum Contaminated Soil*.

## 2.5 Submission of Remediation Plans

Detailed written remediation plans must be forwarded to the department for review prior to the onset of any site remediation work. Further information regarding remediation plans is provided in the department guideline *Submission of remediation plans for Impacted and Contaminated Sites*.

## 2.6 Guidelines and Codes of Practice

### 2.6.1 Canadian Council of Ministers of the Environment

The Canadian Council of Ministers of the Environment (CCME) have published a number of guidelines and documents regarding contaminated sites and impacted sites. CCME documents related to contaminated sites and impacted sites include:

- CCME, *Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, Volumes 1 to 4* (2016).
- CCME, *Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites - Volume I: Main Report, PN 1101 and Volume II: Analytical Method Summaries, PN 1103* (1993).
- CCME, *Subsurface Assessment Handbook for Contaminated Sites, PN 1144* (1994).
- CCME, *Guidance Manual for Developing Site-specific Soil Quality Remediation Objectives for Contaminated Sites in Canada, PN 1197* (1996).
- CCME, *A Framework for Ecological Risk Assessment: General Guidance PN 1195* (1996) and *Technical Appendices, PN 1274* (1997).
- CCME, *Guidance Document on the Management of Contaminated Sites in Canada, PN 1279*, (1997).
- CCME, *Reference Method for the Canada Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, PN 1310* (2001).
- CCME, *Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products, PN 1326* (2003).
- CCME, *A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines, PN 1332* (2006).
- CCME, *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: and Technical Supplement* (2008).
- CCME, *National Classifications System for Contaminated Sites (NCSCS) - Guidance Document, PN 1403* (2008).
- CCME, *Canadian Environmental Quality Guidelines*, (1999 – present) **Note:** these guidelines are periodically updated as new research becomes available.

### 2.6.2 Health Canada Guidelines

Many of the CCME documents reference publications by Health Canada. The following publications may be of use when assessing *contaminated sites* and *impacted sites*:

- Health Canada, *Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment, Version 2.0* (2010).
- Health Canada, *Guidelines for Canadian Drinking Water Quality — Summary Table* (1978 – present).

### 2.6.3 Other Guidelines and Standards

Other guidelines that are frequently utilized when assessing *contaminated sites* and *impacted sites* include:

- Ontario Ministry of the Environment, Conservation and Parks, *Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act* (2011).
- Government of Alberta, *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2023).

There are also national and international industry standards for conducting ESAs that are available for reference when conducting ESAs in Manitoba. These include:

- Canadian Standards Association (CSA) Z768-01 (R2022), *Phase I Environmental Site Assessment* (2001).
- CSA Z769-00 (R2018), *Phase II Environmental Site Assessment* (2000).
- American Society for Testing and Materials (ASTM) E1527-21, *Standard Practice for Environmental Site Assessments; Phase I Environmental Site Assessment Process* (2021).
- ASTM E1903-19, *Standard Practice for Environmental Site Assessments; Phase II Environmental Site Assessment Process* (2019).

## 3.0 Reporting

It is a requirement of the CSRA that the owner or occupier of a site notify the department when they become aware of information indicating that the site has been contaminated at a level that exceeds the standards established by regulation. The CSRA also requires that the owner/occupier of a property submit all relevant information concerning the contamination of a property to the department. For further information on the CSRA, refer to *Guide to the Contaminated Sites Remediation Act (CSRA)*.

Before deciding to report the information on a site, the first step is to understand the Primary, Secondary and Tertiary Standards in the CSRR. The standards from the CCME, the Ontario Ministry of the Environment, Conservation and Parks, and the Government of Alberta have different assessment values for different land uses, soil textures and soil depths. The CCME and Alberta standards also distinguish between conservative Tier I assessment values and more site specific Tier II values. When there is sufficient site information to utilize the Tier II approach in choosing assessment values for a site, those values should also be considered the reporting standards for the site under the CSRR.

However, where there is not enough information on a site to utilize Tier II assessment values, the more conservative Tier I values should be considered as the appropriate reporting standards for the site under the CSRR.

ESA reports that are submitted to the department are reviewed by the department to determine if and how the site should be designated under the CSRA. The CSRA enables the director to designate a site as either a *contaminated site* or an *impacted site*. If the department receives an ESA report that indicates that the site is not contaminated, or that the contamination is at a level that does not exceed the standards established by regulation, the site will not be designated as either a *contaminated site* or an *impacted site*. The owner of the site will be notified of the non-designated status.

Copies of all ESA reports and related technical documentation submitted to the department are kept on file at the department's Winnipeg office.

#### **4.0 Site Assessment - Background**

In all ESAs, qualified environmental professionals should be retained in order to design the most effective assessment program for any given situation or site. It is also recommended that an ESA be conducted by an experienced assessment team in order to ensure an effective assessment/sampling plan, proper collection of representative samples, interpretation of results, and to achieve both the regulatory and scientific objectives outlined in this guideline.

##### **4.1 Introduction**

The purpose of this section is to provide a summary of acceptable approaches and methodologies for conducting ESAs. The methodologies presented in this discussion are primarily intended for the benefit of stakeholders responsible for ensuring the execution of an appropriate ESA.

Noting that one set of standard investigative methods cannot be fully developed to apply to all situations, the approach and methods described in this document are adequate to meet the requirements for the majority of ESAs. Due to the variability in investigative techniques, specific methodologies are not described in this document. It is assumed that the qualified environmental professionals engaged to conduct ESAs will employ accepted industry practices that conform to procedures published by CCME or other recognized standard-setting organizations. Any major variations to generally accepted methods are subject to review and acceptance by the department prior to implementation.

ESAs can be divided into two types: non-intrusive and intrusive ESAs.

##### **4.2 Non-Intrusive Environmental Site Assessments (ESAs)**

In some cases, a non-intrusive ESA, often referred to as a Phase I ESA, may be undertaken at a site to determine the potential for site contamination.

Further information on non-intrusive ESAs is referenced in CSA Z768-01 and ASTM E1527-21.

Phase I ESAs should be supervised and signed-off by an environmental professional with relevant experience assessing site conditions.

For the purpose of identifying sites which may have been affected by contaminants, a Phase I ESA should, at a minimum, consist of the following:

- Review of the site history through the use of historic and current aerial photographs, insurance maps, land title searches, regulatory agency records, previous ESA reports, company records, geological and hydrogeological reports and maps.
- Interviews with present and past site occupants, government officials (federal, provincial and municipal), neighbours, etc.
- Site visits to inspect site conditions, hazardous materials/dangerous goods storage and handling procedures, and to “ground-truth” assessments made in the historical review.

The results of the Phase I ESA should serve to identify areas of potential concern which could be verified during a subsequent detailed intrusive ESA.

### **4.3 Intrusive Environmental Site Assessments (ESAs)**

The objective of an intrusive ESA, also referred to as a subsurface assessment or Phase II ESA, is to characterize the contamination (degree, nature, estimated extent and media affected) and site conditions (geological, ecological, hydrogeological, and hydrological).

Intrusive ESAs should be supervised and signed-off by an environmental professional with relevant experience conducting site assessments, developing sampling plans, planning and executing site investigations, and evaluating and interpreting scientific data.

An intrusive ESA generally includes:

- a planning stage;
- a field investigation program;
- a monitoring program;
- a laboratory analytical program;
- an interpretation and evaluation stage; and
- report preparation.

Further information on intrusive ESAs is referenced in CCME *Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment Volumes 1 to 4* (2016), the CCME *Subsurface Assessment Handbook for Contaminated Sites, PN 1144* (1994) as well as CSA Z769-00 (R2018) and ASTM E1903-19.

### **4.3.1 Investigation Plan**

The purpose of the investigation plan is to ensure the collection of all data required to define the extent and relative degree of subsurface contamination. Site specific knowledge is required to design and execute an effective plan. A site reconnaissance may be necessary to become familiar with the site for plan development and implementation. Site specific factors can include:

- site history and adjacent land use;
- site infrastructure;
- identity of any potential contaminants that have been stored or handled at the site, including the current and past location of storage and handling areas;
- source, type, and estimated volume of any identified contaminant releases;
- site geology, hydrogeology, and hydrology;
- preferential contaminant migration pathways and proximity of receptors;
- underground utilities and services locations; and/or
- presence of any environmentally sensitive areas.

An investigation/sampling plan should describe the individual tasks and sampling efforts, as well as when and how they will be performed. For the interpretation and evaluation of all data collected, the data must be generated by a scientifically effective and valid sampling program.

Key components of the investigation plan should include:

- field equipment requirements;
- borehole and/or test pit location patterns for on-site and off-site assessments;
- groundwater monitoring well location, design, and construction;
- soil/sediment sampling strategy and equipment;
- groundwater monitoring and sampling strategy;
- sample preservation and analytical considerations;
- quality assurance and quality control program and data submission; and
- health and safety requirements.

Site specific knowledge of contaminant migration pathways, and the influence of geological, hydrological, physical-chemical and other factors is often far from complete prior to initiation of field assessments. Subsurface assessments generally require a phased approach, regardless of the initially perceived size or scope of the assessment.

### **4.3.2 Field Investigation Methods**

The number and placement of boreholes or test pits, and monitoring wells required for an assessment will depend on the physical characteristics of the site and the nature of the potential contaminants. The initial phase of the investigation will concentrate on the areas where contaminants are most likely to be found in soil or groundwater. Typical areas would include fuel and/or chemical storage and handling sites, process tank areas and

any areas with visible staining. The extent of the subsurface investigation will then be determined from the evaluation of the conditions encountered during the investigation. Where contamination is encountered during an assessment, the extent of the contaminant plume in soil and in groundwater must be delineated.

### 4.3.3 Laboratory Analysis

For the procedures and parameters analysed, all laboratory analysis submitted to the department as part of an ESA report must be undertaken by facilities accredited by:

- the Standard Council of Canada (SCC); and/or
- the Canadian Association for Laboratory Accreditation Inc. (CALA).

For reference, refer to the CCME, *Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment Volume 4 Analytical Methods* (2016).

## 5.0 Assessment of Findings

After sufficient data has been compiled to determine the degree and extent of contamination, the site is classified using established criteria for further action. These assessment results are used to establish remediation target levels based on the risk to human health and the environment.

### 5.1 Selecting Assessment Criteria

Assessment criteria are used to assess the significance of the data acquired during the field investigation. These criteria can then be used to decide if remediation is required at the site.

Assessment criteria are divided into three broad categories:

- 1 Criteria that are protective all pathways and receptors** (referred to as Tier 1 Criteria in CCME Environmental Quality Guidelines (EQG)). These are the most conservative criteria available for assessing data from a field investigation. These are available through published guidelines and are used when there is limited site information or in instances where the environmental professional conducting the assessment wishes to apply the most conservative criteria to the data from the field investigation.
- 2 Criteria that are specific to the pathways and receptors active on a site** (referred to as Tier 2 Criteria in CCME EQG). These criteria are available through published guidelines and include all the pathways and/or receptors that could be applicable on the site. Adequate information must be acquired during the investigation to justify exclusion of pathways. The published guidelines provide guidance as to what information is needed to determine if a pathway and/or receptor is applicable to a site or if it can be excluded.

- 3 Site specific risk assessment criteria** (referred to as Tier 3 Criteria in CCME EQG). These are developed when site conditions, receptors, and/or exposure pathways differ significantly from those assumed in the derivation of guidelines, where there are significant ecological concerns or where there are unacceptable data gaps. The development of site specific risk assessment criteria requires extensive data acquisition. If site specific risk assessment criteria are to be developed for one of the contaminants of concern on a site, they should also be developed for all the contaminants of concern.

## 5.2 Published Guidelines for Assessment Criteria

The department has adopted the guidelines published by the CCME for assessment of sites in Manitoba. Reports submitted to the department should use the current versions of the following CCME documents for selecting assessment criteria:

- CCME, *Canadian Environmental Quality Guidelines*, (1999 – present) Note: these guidelines are periodically updated as new research becomes available.
- CCME, *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: and Technical Supplement* (2008).

For the assessment of potable water quality, the department requires the use of the *Guidelines for Canadian Drinking Water Quality* published by Health Canada. The *Guidelines for Canadian Drinking Water Quality* are periodically updated and environmental professionals must use the most current versions for assessment purposes.

Where the guidelines above do not provide adequate information or guidance for the assessment of a particular parameter, environmental professionals can utilize current versions of published guidance documents from other jurisdictions provided the use of such documents is adequately justified in the report (such as one of the following documents):

- Ontario Ministry of the Environment, Conservation and Parks, *Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act* (2011).
- Government of Alberta, *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2023).
- Government of Alberta, *Alberta Tier 2 Soil and Groundwater Remediation Guidelines* (2023).

If a site-specific risk assessment has been chosen the following additional documents should be applied:

- CCME, *Guidance Manual for Developing Site-specific Soil Quality Remediation Objectives for Contaminated Sites in Canada* (1996).

- CCME, *A Framework for Ecological Risk Assessment: General Guidance PN 1195* (1996) and *Technical Appendices, PN 1274* (1997).
- Health Canada, *Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment, Version 2.0* (2010).

It is the responsibility of the environmental professional making the ESA to choose appropriate assessment criteria based upon the information available and the needs of their client. When using any guidance documents to select assessment criteria, the process must be consistent with the information requirements for selecting criteria that are referenced in those documents. The goal of the process is to find the most scientifically valid assessment criteria.

### **5.3 Report Recommendations**

After the findings of a site investigation have been used to classify a site and appropriate assessment criteria developed, the environmental professional assessing the site is expected to provide:

- A clear statement of the risks to human health and/or environment posed by the contaminants present on a site including an analysis of the potential pathways for contaminants to affect potential receptors.
- Unambiguous recommendations for the site. These can include, but are not limited to, recommendations for further assessment and/or remediation.

### **5.4 Site Classification**

Site classification is the process whereby the findings of the ESAs are used to establish the priority for remedial action at the site. This process can be applied several times to a site as more data becomes available.

Based on the information provided by the ESA, the site should be classified as to the relative risk to human health and the environment. Site classification can be undertaken employing CCME, *National Classification System for Contaminated Sites, Guidance Document PN 1403 (2008)* or by employing similar evaluative processes such as the ASTM E1739-95 (2015), *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (2015).

Site classification shall be undertaken as part of the ESA process.

### **6.0 Report Requirements**

When submitting an ESA report, property owners and environmental professionals should be aware that the department expects that the author of the report will meet acceptable standards for reporting. If a report does not meet these requirements, the author will be

required to rewrite the ESA report and, if necessary, conduct further investigations. Whenever possible, reports should be submitted electronically.

## **7.0 For More Information**

For more information, please contact the Contaminated Sites Program at [ContaminatedSites@gov.mb.ca](mailto:ContaminatedSites@gov.mb.ca).