BS ISO 18400-203:2018

BSI Standards Publication

Soil quality — Sampling

Part 203: Investigation of potentially contaminated sites

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National foreword

This British Standard is the UK implementation of ISO 18400-203:2018.

BS ISO 18400-203:2018 is intended to be used in conjunction with BS 10175:2011+A2:2017 and other members of the BS ISO 18400 series of standards as appropriate. Where there are differences in the guidance given in this standard and that in BS 10175:2011+A2:2017, the guidance in BS 10175:2011+A2:2017 takes precedence.

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Partie 203: Investigation des sites potentiellement contaminés

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 2, *Sampling*.

This first edition of ISO 18400-203, together with ISO 18400-104 and ISO 18400-202, cancels and replaces ISO 10381-5:2005, which has been technically and structurally revised.

The new ISO 18400 series is based on a modular structure and cannot be compared to ISO 10381-5 clause by clause.

A list of all parts in the ISO 18400 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document is one of a series of standards dealing with various aspects of site investigation and sampling. It is intended to be used in conjunction with the other parts of the ISO 18400 series. The role/position of the individual standards within the total investigation programme is shown in Figure 1.

While serious cases of soil contamination mostly occur on urban and industrial sites, serious contamination of agricultural land can also occur (for example, due to pesticides usage, long-term irrigation and application of organic wastes). In addition, it is important to recognize that agricultural, near-natural and wooded sites, etc. are sometimes developed on deposited wastes or suffer severe aerial deposition when close to industrial sites. In such cases, a combination of the methodologies described in ISO 18400-205 and in this document would be appropriate.

An understanding of the surface water, groundwater and soil gas regimes is essential to the assessment of the potential risks to human health and safety and to other potential receptors including, for example, groundwater resources. However, the provision of detailed guidance on the investigation of groundwater, surface water and soil gas falls outside the scope of this document. For more information on groundwater and surface water sampling, see ISO 5667. Guidance on the sampling of soil gas is provided in ISO 18400-204.

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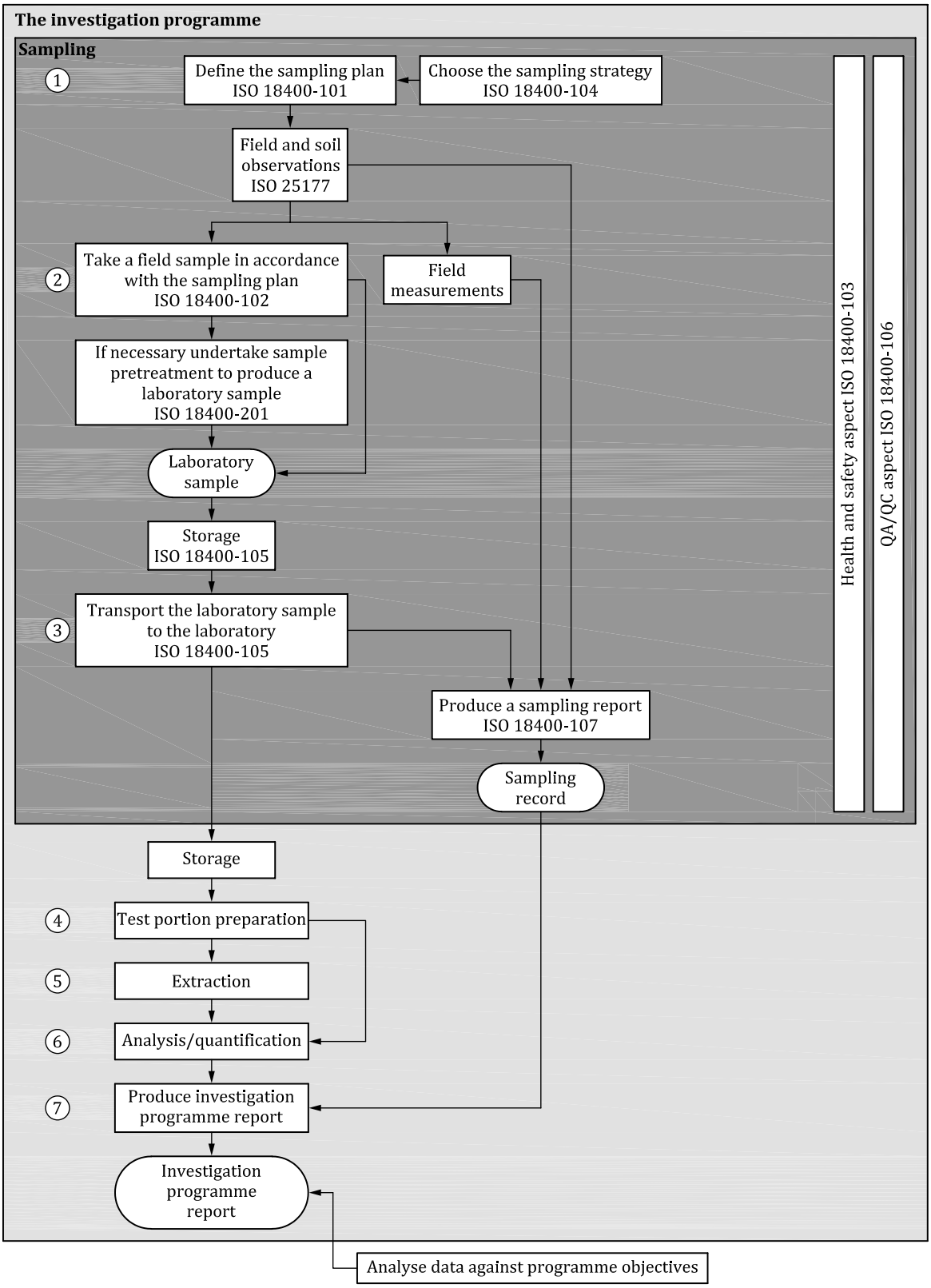

NOTE 1 The numbers in circles in this figure define the key elements (1 to 7) of the investigation programme.

NOTE 2 This figure displays a generic process which can be amended when necessary.

Figure 1 — Links between the essential elements of an investigation programme

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Soil quality — Sampling —

Part 203: Investigation of potentially contaminated sites

1 Scope

This document gives guidance on the:

— investigation of sites, where either it is known that soil contamination is present, or the presence of soil contamination is suspected;

— investigation of sites where no soil contamination is expected, but the soil quality is to be determined (e.g. to make sure that there is no contamination present);

— investigation in anticipation of a need to manage re-use or disposal of excavated soil which might be contaminated;

— collection of information that is necessary for risk assessment and/or the development of remedial action plans (e.g. whether remediation is required and suggestions as to how this might be best achieved).

Although the information on soil quality for the risk assessment and/or the development of remedial action plans is gathered by applying this document, it does not give guidance on the decisions and actions that follow from a site investigation, for example, risk assessment and decisions about the requirements for remediation (if any).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11074, *Soil quality — Vocabulary*

ISO 18400-104, *Soil quality — Sampling — Part 104: Strategies*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11074 and ISO 18400-104 apply.

NOTE When the definitions in these two standards differ, those in ISO 18400-104 take precedence.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

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4 Objectives

4.1 General

This document provides a framework for the various phases and stages in the investigation of potentially contaminated sites. The resulting determination of the contamination status can then lead to risk assessment and, where necessary, facilitate the selection and application of appropriate remedial actions. Guidance on data and information requirements for particular purposes is provided in a number of International Standards including ISO 11504, ISO 15175, ISO 15176, ISO 15799 and ISO 15800.

Investigations for contamination could be required:

— when the purpose is to identify and deal with contamination (e.g. site where it is known or believed there might be unacceptable risks to humans or other receptors – sometimes called "problem" sites);

— incidental to plans for the redevelopment of sites (e.g. of an industrial site for housing); or

— especially in urban areas, because it is known that possibly contaminated soils will have to be excavated and removed from the site (e.g. because basements are to be formed, utilities installed or underground infrastructure built).

The guidance provided in this document should be adapted as appropriate for these and any other circumstances where potential contamination is an issue.

NOTE 1 Contamination is defined in ISO 11074 as a result of human influences; however, the methods described for investigation are also applicable where there are naturally high concentrations of potentially harmful substances.

NOTE 2 With respect to remediation, this document only provides guidance on the information required in general. Specific remediation methods could need additional information.

NOTE 3 This document deals only with the investigation of the ground. On old urban and industrial sites, there could be derelict buildings and/or industrial plants awaiting demolition, dismantling or refurbishment. Failure to investigate these buildings before demolition could put the safety of workers at risk or lead to the spread of contamination on and around the site. The investigation of derelict buildings or remnant foundations falls outside the scope of this document.

NOTE 4 In many situations, there is a close relation between the contamination of the soil, groundwater, soil gas and, to a lesser extent, surface water. Consequently, an understanding of the surface water, groundwater and soil gas regimes is essential to the assessment of the potential risks to human health and safety and to other potential receptors including, for example, groundwater resources. However, the provision of detailed guidance on the investigation of groundwater, surface water and soil gas falls outside the scope of this document. For more information on groundwater and surface water sampling, see ISO 5667. Guidance on the sampling of soil gas is provided in ISO 18400-204.

4.2 Definitions of objectives

The reasons for an investigation and hence the objectives can vary widely but are generally to:

— identify and assess the risks to those using the site, and in the event of redevelopment, to subsequent users and occupiers of the site;

— identify and assess the risks presented to the environment including adjacent land, surface and groundwater, ecosystems and public health;

— identify and assess the risks which could be presented to workers who are involved in investigation, remediation, redevelopment or maintenance of the site;

— enable proper management of excavated materials especially on urban sites;

— identify and assess the potential for adverse effects on building materials;

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so that decisions can be made about the importance of the risks and whether it is necessary to take any form of action to deal with them.

From the principal objectives of the investigation, a number of subsidiary objectives can be derived. These might include the following:

a) determine if any immediate action is required to protect exposed receptors;

b) identify compounds that are, or might be, present that might represent a risk to one or more actual or potential receptors;

c) identify receptors (e.g. human, ecosystems, groundwater) that are or might in the future be at risk;

d) identify pathways by which particular receptors might be exposed to the contaminants;

e) provide the data and other information to use in a risk assessment;

f) provide information to aid the design of protective or remedial measures;

g) provide information to aid the management of excavated soil and other materials;

h) enable characterization of contaminated soil and other materials to ensure safe and suitable handling and disposal;

i) provide reference data against which the achievement of remediation performance can be judged;

j) enable judgements to be made about the likely impact of continued use of the site on the environment including soil quality;

k) provide information to assess the risk of (legal) environmental liabilities and the effect on the value of the property.

These generalized objectives will be formulated into specific requirements depending upon the purpose of the investigation.

EXAMPLE A site investigation prior to the purchase of a site for redevelopment could have one or more of the following objectives:

— establish the history of the site and the potential for the presence of contamination;

— establish the nature, extent and distribution of contamination within the site boundaries;

— identify the potential for migration of contamination beyond the site boundaries including surface and groundwater (this could indicate there are potential legal environmental liabilities);

— identify any immediate dangers to public health, safety, and the environment;

— identify contamination-related constraints in relation to a proposed development (e.g. human and environmental risks) and any remedial works necessary and provide data from which to develop cost estimates;

— provide information to facilitate the formulation of a full interpretative report with conclusions, recommendations and budget costing for remedial actions, if required;

— provide information to facilitate the advice to the client about how to address the issues raised by any off-site migration of contamination.

5 General strategy of site investigation

5.1 General

Determination of the extent of a contaminated area and, particularly, the assessment of human and environmental risks caused by contamination can be complex. Because of this complexity, the process

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of identifying, quantifying and evaluating the risks associated with contaminated land should be an iterative process with several phases of investigation (each with specific objectives to be achieved), in order to obtain sufficient relevant data to characterize the potential risks, pathways and receptors of concern. The objectives should be reconsidered at each stage, and the requirements for further investigation reviewed as the investigatory and assessment processes are developed.

NOTE 1 General guidance on the development of site investigation strategies and sampling strategies is provided in ISO 18400-104. Guidance on the preparation of a sampling plan is provided in ISO 18400-101.

The principal phases are

— preliminary investigation (see 5.2 and Clause 6),

— exploratory investigation (see 5.3, Clause 7 and Clause 8), and

— detailed (main) site investigation (see 5.4, Clause 7 and Clause 9).

The relationship between these phases is illustrated in Figure 2.

Supplementary investigations could be required subsequent to the detailed site investigation in order to provide information relevant to the selection of remedial methods, or design of remediation or construction works.

On completion of the on-site work during any phase or stage of investigation, a sampling report should be prepared in accordance with ISO 18400-107.

Following completion of any phase or stage of investigations, a report giving its results should be prepared (see 8.4 and 9.6).

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