

## **Planning Guidance in Relation to Ground Contamination: Guidance Note for Applicants, Developers, Land Owners and Consultants**

A flow chart showing a typical example of the contaminated land planning procedure can be found in Appendix A, together with a checklist in Appendix B outlining the information required in support of a planning application. It is strongly recommended these are consulted prior to submission of information as **reports which fail to consider the issues outlined in this document will be considered unsatisfactory and returned.**

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# **i. CONTEXT**

## **Who is this guidance aimed at?**

Developers, land owners, consultants and anyone else involved in the preparation of land contamination reports for submission to South Ribble Borough Council.

## **What is the aim of this guidance?**

To inform the audience of the type of information that South Ribble Borough Council requires in order to consider technical reports submitted for assessment in accordance with conditions imposed on a planning permission.

## **What issues does this guidance address?**

The main issues of concern to South Ribble Borough Council during the investigation and remediation of land affected by contamination are the protection of human health and the environment and to ensure compliance with regulatory regimes enforced by the authority.

## **Why is this guidance required?**

South Ribble Borough Council receives many requests for advice and comment on site investigation and remediation activities at sites affected by contamination. However, the technical reports submitted with these requests frequently do not:

- fully address potential risk to human health and the environment, or
- contain sufficient information to demonstrate how these risks can be mitigated.

As most of the requests received relate to redevelopment schemes, failure to provide adequate reports and information may result in significant delays in the planning process or planning permission being refused by the Local Planning Authority. Any site that is not remediated to an appropriate standard may be inspected and subsequently determined by South Ribble Borough Council as Contaminated Land under Part 2A of the Environmental Protection Act 1990.

## **How should this guidance be used?**

This guidance is intended to reflect good practice. Failure to submit information to the standard referred to in this guidance may result in reports being rejected or further information requested by South Ribble Borough Council.

## ii. OVERVIEW

Many areas of the borough have previously been occupied by a variety of industrial activities. Historically, the predominant industries included bleach works, rubber works and motor works. In general, early industrialists had little or no knowledge of the environmental effects of their manufacturing processes or operating practices. Consequently over a period of time a particular site may have been home to a variety of industries, each of which may have left substances in the ground that may be hazardous to human health and the environment.

The Government's updated National Planning Policy Framework refers to redevelopment on brownfield land and, as such, developers have to account for the possibility of land contamination. The purpose of this guide is to make applicants, developers and their advisors aware of the information that South Ribble Borough Council requires in order to assess an application for planning permission on land that may be affected by the presence of contamination.

In order to assess submitted information, the Contaminated Land Team in Environmental Health would expect a developer to demonstrate that due consideration has been given to the guidance contained within this document.

For more detail on the underpinning principles on which this document is based, the reader is directed to ***CLR 11 Model Procedures for the Management of Land Contamination***<sup>1</sup> and the ***National Planning Policy Framework***<sup>2</sup>.

**This Guidance Note is written to serve as an informative and helpful source of advice. Readers must note that legislation, guidance and practical methods may be subject to change. This Council has taken all reasonable precautions to ensure that the information contained in this guidance document is correct. The Council, its officers and agents cannot accept any liability or loss or damage caused by any person as a result of reliance on this information or for any errors or omissions in the information provided.**

<sup>1</sup> Available free to download from [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

<sup>2</sup> Available free to download from [www.communities.gov.uk](http://www.communities.gov.uk)

# 1. WHAT IS CONTAMINATED LAND?

Local Authorities are responsible for addressing contaminated land issues within two separate regimes: the Contaminated Land Regime (commonly known as 'Part 2A') and the Planning Regime (Development Control).

## 1.1 Definition under Part 2A of the Environmental Protection Act 1990

Part 2A of the Environmental Protection Act 1990, as inserted by Section 57 of the Environment Act 1995, came into force on 1 April 2000. It requires all local authorities within England and Wales to identify contaminated land in its area and secure its remediation to a condition suitable for its current use.

The legal definition of contaminated land, as defined in Section 78A(2) of Part 2A of the Environmental Protection Act 1990 is:

*“any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:*

- (a) significant harm is being caused or there is significant possibility of such harm being caused; or*
- (b) significant pollution of controlled waters is being, or is likely to be caused....”*

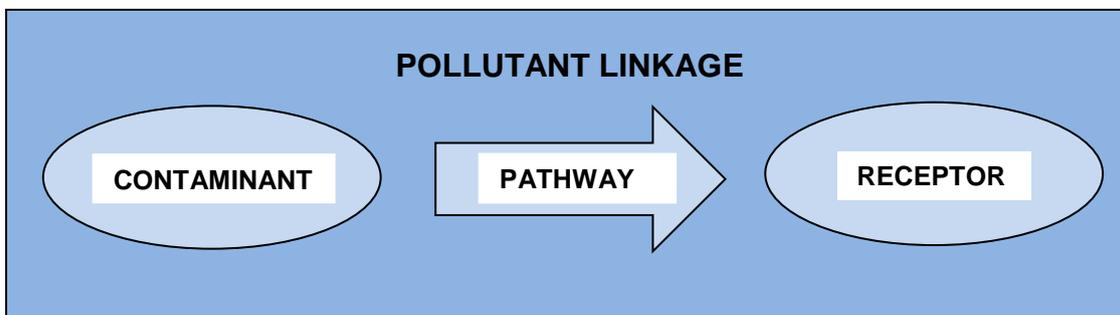
With respect to controlled waters, the Water Act 2003 (Chapter 37, Section 86) has amended the second part of the definition so that it applies only where:

*“**significant** pollution of controlled waters is being caused, or there is **significant possibility** of such pollution being caused”.*

When dealing with land contamination, there are three essential elements which link together to result in a risk:

- **A contaminant**
- **A receptor**
- **A pathway**

These three elements can exist independently, but may result in a risk when they link together. The link between a contaminant, pathway and receptor is described as a '**contaminant linkage**'. All three elements of the contaminant linkage need to be present for there to be a risk of any magnitude. If one or more of these elements is not present, there cannot be a risk and the land should not be identified as contaminated land under the regime. There may be more than one pollutant linkage on any given piece of land.



A **CONTAMINANT** (or source, pollutant, or hazard) is a substance which is in, on or under the land and which has the potential to cause harm or to cause pollution of controlled waters.

A **PATHWAY** is the route by which the contaminant reaches the receptor.

A **RECEPTOR** (or target) is something that may be adversely affected by a contaminant (e.g. living organisms, ecological systems or property).

Each of these elements is defined in Section 3.8 of the Contaminated Land Statutory Guidance for Part 2A, issued by DEFRA in April 2012<sup>3</sup>.

## 1.2 Planning Definition

The National Planning Policy Framework (NPPF) does not give a definition of contaminated land. Instead, Annex 2 gives a general definition of pollution as:

- “Anything that affects the quality of land, air, water or soils, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam, odour, noise and light.”

Specific reference is made to land contamination in paragraph 120:

- “Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or land owner.”

The framework goes on to state in paragraph 121 that planning policies and decisions should also ensure that:

- “the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;
- “after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990; and
- “adequate site investigation information, prepared by a competent person is presented.”

<sup>3</sup> Available free to download from [www.defra.gov.uk](http://www.defra.gov.uk)

The definition in Annex 2 states that site investigation information:

“Includes a risk assessment of land potentially affected by contamination, or ground stability and slope stability reports, as appropriate. All investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175 (2001) *Code of Practice for the Investigation of Potentially Contaminated Sites*<sup>4</sup>). The minimum information that should be provided by an applicant is the report of a desk study and site reconnaissance.”

A competent person (who prepares site investigation information) is defined in Annex 2 as:

“A person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation.”

The key point is that under the planning system, risks have to be assessed based on the new or intended use of the land, rather than the existing use.

The principles underlying both the Part 2A and planning regimes are fundamentally the same; namely, **the identification and remediation of land that may pose a risk to human health and/or the environment.**

## 1.3 Types of Contamination

Typical causes of land contamination include previous industrial or commercial usage, mining and the landfilling of wastes. Land can also become contaminated due to its proximity to contaminated areas. Former agricultural land may also have the potential to contain contamination. Soil used for food production, either arable or for raising livestock, may have been affected by inorganic or organic contamination, particularly through the application of animal slurries, fertilisers and agrochemicals over a number of years.

Contaminating substances may include:

- Metals, e.g. arsenic, cadmium, chromium, iron, lead, nickel
- Inorganic compounds e.g. cyanide, ammonium, chlorides
- Organic substances e.g. oils, petrol, solvents, phenols, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs)
- Gases e.g. methane, carbon dioxide, hydrogen sulphide, volatiles
- High or low pH

Contamination may not occur solely as a result of human activities and land can be contaminated as a result of its natural state. For example, marsh gas can cause a contamination problem, particularly in areas with peat-rich soils.

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<sup>4</sup> This document was updated in 2011 and is available from [shop.bsigroup.com](http://shop.bsigroup.com)

## 2. ROLE OF THE OWNER/DEVELOPER

Where development is proposed, the developer is responsible for ensuring that development is safe and suitable for use for the purpose for which it is intended, or can be made so by remedial action. In order to demonstrate this, the developer should determine:

- i. Whether the land in question is already affected by contamination through contaminant-pathway-receptor linkages;
- ii. Whether the proposed development will create new linkages, e.g. new pathways by which existing contamination might reach existing or proposed receptors and whether it will introduce new vulnerable receptors, and;
- iii. What action is needed to break those linkages and avoid new ones, deal with any unacceptable risks and enable safe development and future occupancy of the site and neighbouring land.

A potential developer will need to satisfy the local authority that unacceptable risk from contamination will be successfully addressed through remediation without undue environmental impact during and following the development.

In doing so, a developer should be aware that actions or omissions on his part could lead to liability being incurred under the Part 2A regime; e.g. where development fails to address an existing unacceptable risk or creates such a risk by introducing a new receptor or pathway.

Where an agreed remediation scheme includes future monitoring and maintenance schemes, arrangements will need to be made to ensure that any subsequent owner is fully aware of these requirements and assumes ongoing responsibilities

### 3. THE PLANNING PROCEDURE

The actual or possible presence of contamination is a material planning consideration. Best practice guidance, such as that set out in the National House-Building Council (NHBC) document *Guidance for the Safe Development of Housing on Land Affected by Contamination*<sup>5</sup> recommends a precautionary approach when redeveloping brownfield sites. The possibility of contamination should be assumed when considering planning applications in relation to land subject to or adjacent to previous industrial use. Also the possibility of contamination should be addressed for developments that are particularly sensitive to contamination, e.g. housing, schools, hospitals, or children's play areas.

Where development is proposed on land potentially affected by contamination, an assessment of risk should be carried out by the applicant for consideration by the Local Planning Authority (LPA) before the application is determined. Any existing or new unacceptable risks should be identified and proposals made to deal with them effectively as part of the development process.

When the planning application is made, the Planning Officer will consult with the Contaminated Land Team and the application (with supporting information) will be assessed to determine whether:

- there is the potential for contamination to influence the site,
- suitable measures have been proposed to address any risk, and
- the proposed development is acceptable.

Other statutory bodies and relevant local authority departments may also be consulted as necessary, including the Environment Agency, Natural England, English Heritage and the bodies responsible for building control, conservation, archaeology and engineering.

If there is the potential for contamination to affect the site, or the end-use is particularly sensitive, recommendations will be made that certain conditions be imposed on the development. These conditions will ensure that the site is made suitable for its proposed end use and ensure the safety of site workers, future site users and the protection of the environment.

It is essential that the developer and their agents provide as much information as possible to the LPA at every stage of the planning process. Withholding information, however trivial, may cause a delay to the application. The onus is on the applicant to keep the LPA well informed about the development at all times so that decisions can be made swiftly and the application process completed as quickly as possible.

For large developments on sites where serious contamination is known, or is likely to be present, it is strongly recommended that a pre-application consultation with the LPA be undertaken. It will save both time and money if a thorough pre-application consultation takes place prior to submission of the planning application.

**A flowchart illustrating a typical example of the contaminated land planning procedure can be found in Appendix A.**

<sup>5</sup> Available free to download from [www.nhbc.co.uk](http://www.nhbc.co.uk)

## 4. CRITERIA USED FOR ASSESSING THE ADEQUACY OF SUBMITTED INFORMATION

Information submitted in support of planning applications must be of an acceptable minimum standard in order to satisfy the Local Planning Authority (LPA). The guidance contained within this section aims to inform developers of the procedural requirements of a risk-based approach to land contamination, as defined in current UK legislation and guidance.

As detailed, the technical framework for investigation and dealing with land affected by contamination is contained within the document *CLR 11 Model Procedures for the Management of Land Contamination*. CLR 11 sets out the processes to identify, make decisions on and implement action to deal with land contamination in a way that is consistent with government policies and legislation within the UK.

The approach outlined in this Guidance Note is consistent with the CLR 11 technical framework and is based on a staged or tiered approach to risk assessment, which includes the following three key elements:

- Risk Screening
- Generic Quantitative Risk Assessment (GQRA)
- Detailed Quantitative Risk Assessment (DQRA)

Risk screening generally involves developing a conceptual model (see Section 4.1), which identifies whether there could be any potentially unacceptable risks at the site. The conceptual model may then be used to determine if any further assessment is required. If this preliminary assessment clearly demonstrates that contamination at the site poses no unacceptable risk (i.e. no contaminant-pathway-receptor linkage) then the GQRA may not be required.

The procedure for investigating a potentially contaminated site would be expected to meet the criteria outlined in the *British Standard (BS) 10175 (2011) Investigation of Potentially Contaminated Sites – Code of Practice*<sup>6</sup>. A report (or series of reports) submitted in support of a planning application would generally include the following four components:

- Phase I investigation
- Phase II investigation
- Remediation strategy
- Verification Report

**A more detailed checklist of LPA requirements in relation to each of these components can be found in Appendix B.**

<sup>6</sup> Available from [shop.bsigroup.com](http://shop.bsigroup.com)

## 4.1 Phase I investigation

A Phase I investigation should provide a preliminary qualitative assessment of risk by interpreting information on a site's history and identifying potential contaminants present. The Phase I investigation typically consists of a **desk study**, **site walkover**, development of a **conceptual model** and basic **hazard assessment**.

The **desk study** comprises a search of available information and historical maps, which can be used to identify the likelihood of contamination being present. The two main indicators for the likely presence of contamination at a site are past industrial uses and/or close proximity to a landfill. A detailed appraisal of documentary research can be found in Section 6.2.1.2 of BS10175:2011. For details of information required for a typical desk study see Appendix B.

A simple **site walkover** survey of the site is conducted to identify if there are any obvious signs of contamination at the surface. Further information regarding site inspection can be found in *CLR 2 (1994), Guidance on Preliminary Site Inspection of Contaminated Land*<sup>7</sup>.

A **conceptual model** is representative (text and/or graphics) of the contaminant linkages identified in the preliminary risk assessment (See *Figure 1*). Developing a conceptual model should be viewed as an iterative process that should be refined during subsequent phases of assessment. For details of information required for a conceptual model see Appendix B.

Using the information gathered, the conceptual model of the site is constructed and a basic **hazard assessment** is carried out.

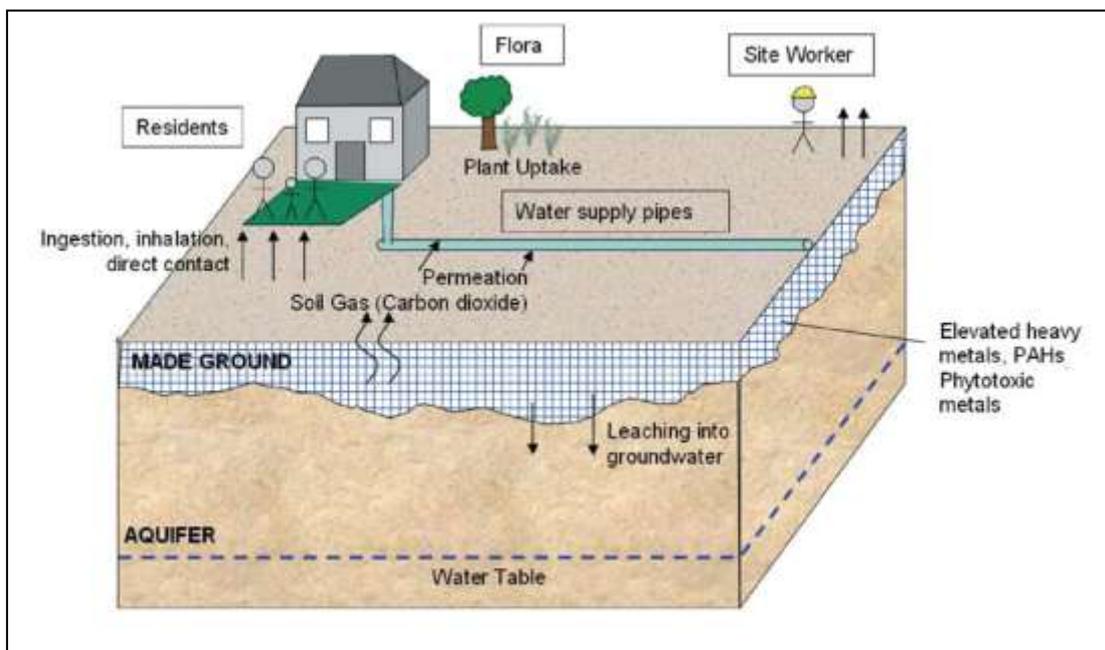


Figure 1 showing a conceptual model (taken from NHBC guidance, 2008)

<sup>7</sup> Available free to download from [www.eugris.info](http://www.eugris.info)

## 4.2 Phase II investigation

A Phase II investigation aims to reduce the uncertainties identified in the initial conceptual model by quantifying potential contamination at the site. The data obtained will be used to inform a decision as to whether the site is potentially harmful.

A Phase II report generally consists of an intrusive **site investigation** and a subsequent **risk assessment**. The investigation process should seek to clearly identify and characterise plausible contaminant-pathway-receptor linkages at the site and provide information for the refinement of the initial conceptual model.

## 4.3 Remediation Strategy

This is a document detailing what action is to be carried out so that contamination no longer presents a risk to site users or ecological systems. It may include measures such as the removal, encapsulation or treatment of contaminants, or measures to break the pollutant linkages. Please note that Government policy encourages sustainable methods of remediation.

A remediation strategy should be submitted where a site investigation identifies levels of contamination that will require remediation prior to the site being suitable for its intended use. This statement should include full details of how the contamination problem at the site will be addressed and demonstrate that the standard of remediation work complies with current best practice and guidance. This must be approved by the LPA before any remedial actions at the site commence.

## 4.4 Verification report

Where contamination has been found and remediated, the developer will be required to submit a verification report. In certain circumstances it may be necessary for the developer to conduct post-completion monitoring. This should be undertaken to the approval of the LPA and results of the monitoring should be submitted for review. For limited remediation works or protective works, a verification statement alone may be acceptable, but prior confirmation of this should be obtained from the LPA.

The verification report should provide confirmation that all measures outlined in the approved remediation statement have been successfully completed, including where appropriate, validation testing.

On large schemes where development may be phased, progressive discharge of conditions may be possible provided a satisfactory verification report is received for each phase.

**Recommendations to discharge contaminated land conditions will only be made once the Contaminated Land Team has received and approved a satisfactory Verification Report.**

## 5. GENERIC GUIDANCE

The complexity of contaminated land technical guidance, coupled with individual site variability makes it difficult to produce comprehensive guidance applicable to every situation.

However, when assessing the adequacy of a site investigation, a number of common problems frequently arise. These generally relate to areas where technical guidance may be complex or incomplete. In an attempt to minimise the occurrence of these problems, the Contaminated Land Team applies consistent criteria for certain technical aspects of a site investigation. Section 5 of this document is therefore intended to highlight recurring problem areas and key points that are of particular importance.

### 5.1 Obtaining representative samples

All sampling strategies should be designed to provide data that is representative of the site conditions as a whole. Sampling should be undertaken in accordance with recognised sample collection methodology and guidance, with reference made to recommendations within BS10175:2011. Reference to the historical site information obtained from the desk top study is essential in order to target possible sources of contamination and to ensure that an appropriate suite of analysis is performed. Justification for the chosen sampling regime and analysis suite should be clearly set out in the site investigation report

### 5.2 Sample analysis

A suitably accredited laboratory should be used to undertake analysis of samples. The site investigation should include a detailed plan showing the location of sampling points and accreditation details of the analytical technique used, together with summary tables of results. A full set of results, including borehole/trial pit logs, should be included.

The Environment Agency (EA) has established its Monitoring Certification Scheme (MCERTS) to deliver quality environmental measurements. In line with the requirements of the EA, South Ribble Borough Council requires that samples are analysed to MCERTS standards where available. Further information regarding MCERTS can be obtained from the EA website: [www.mcerts.net](http://www.mcerts.net).

### 5.3 Generic quantitative risk assessment (GQRA)

In 2009 DEFRA and the EA published science reports relevant to the assessment of human health risks arising from contaminants in soil<sup>8</sup>. The science reports are currently the key instruments in the UK for the generic assessment of risks to human health from land affected by contamination. Alongside these science reports, the EA produced specialist software, Contaminated Land Exposure Assessment (**CLEA**), and associated Soil Guideline Values (**SGVs**) for various substances.

**Frequently asked questions regarding the planning process and contaminated land are presented in Appendix C.**

<sup>8</sup> Available free to download from [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

The CLEA software models the risks to human health from long-term exposure to contaminants, via various pathways, for a range of standard land use scenarios. To date SGVs have been produced for ten substances – arsenic, cadmium, chromium, nickel, mercury, selenium, benzene, toluene, ethyl-benzene, xylene, and dioxins/furans/dioxin-like PCBs. TOX Reports, providing background toxicological information, have been produced for 11 other substances, but based on an older version of CLEA. Care should be taken if using these older TOX Reports to derive assessment criteria.

To fill the gaps in the list of substances for which there are no SGVs, generic assessment criteria values have been published by other parties including:

- The LQM/CIEH (2009) Generic Assessment Criteria (GAC) for human health risk assessment for 81 substances.<sup>9</sup>
- The CL:AIRE publication *Soil Generic Assessment Criteria for Human Health Risk Assessment* (2010) for over 120 substances.<sup>10</sup>
- Atkins (2011) ATRISK Soil Screening Values (SSVs).<sup>11</sup>

These publications and associated values are considered acceptable by the Contaminated Land Team if used in reports to derive assessment criteria as part of a development site's GQRA. When submitting a report that uses these values, their source must be referenced in the report.

Where an SGV does not exist for a particular substance, site specific target levels should be calculated based on suitable risk assessment methodologies (such as CLEA and using properly research toxicology data). However, this work is relatively specialised and should be conducted by a risk assessor with suitable expertise.

## 5.4 Detailed quantitative risk assessment (DQRA)

In some instances generic assessment criteria are either unsuitable, unavailable or exceeded. In these cases it will be necessary either to use other generic criteria or to calculate site specific assessment criteria, based on toxicology data. A specialist risk assessor will almost certainly be needed to undertake the work, which should be based upon the comprehensive risk assessment guidance provided in CLR 11.

When reviewing a report containing a DQRA, the Contaminated Land Team will need to be satisfied with the **site-specific criteria** proposed and the approach used in its derivation. The developer should therefore provide a documented assessment which can be evaluated by the Contaminated Land Team, who will be looking for transparency in deriving values, evidence of sound science and clarity in any assumptions made.

## 5.5 Assessment criteria for ground gas

There are a number of potential sources of **hazardous gases** including landfill sites, made ground, mine workings, fuel spillages, peat-rich soils, and radon-emitting rocks. If a development is suspected of being at risk from methane, carbon dioxide, radon, or hydrocarbon vapours, it will be necessary to assess the potential risk and if required incorporate appropriate gas protection measures into the development design.

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<sup>9</sup> Available from [www.lqm.co.uk](http://www.lqm.co.uk)

<sup>10</sup> Available free to download from [www.claire.co.uk](http://www.claire.co.uk)

<sup>11</sup> Available from [www.atrisksoil.co.uk](http://www.atrisksoil.co.uk)

Guidance for assessment of the risks associated with ground gases can be found in a number of publications that follow the risk assessment methodology of CLR 11:

- CIRIA Report C665 (2007) *Assessing risks posed by hazardous ground gases to buildings*.<sup>12</sup>
- NHBC/RSK Group Plc (2007) *Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present*.<sup>13</sup>
- British Standard BS8485:2007 *Code of practice for the characterisation and remediation from ground gas in affected developments*.<sup>14</sup>

Key to assessing risks from ground gases is the development of a conceptual model showing contaminant sources, pathways and receptors. From this, a site investigation can be drawn up, the results of which used to refine the model. Site investigations for ground gas assessment include the installation of monitoring wells from which gas concentrations can be measured. CIRIA report C665 provides information on the location, number and installation of boreholes across a site. The logs of the installed boreholes should be included with the investigation report.

Following well installation, a site is monitored for a period of time dependent on the development sensitivity and generation potential of the ground gas source. For example, a residential development (high sensitivity) on an historical landfill site (high generation potential) will require a monitoring period of 12 to 24 months. Monitoring is usually conducted by a competent person, using specialist landfill gas equipment, and should include at least two visits when atmospheric pressure (a driver for ground gas emissions) is below 1000 millibars and falling.

Spike testing and data obtained from trial pit installations is not considered acceptable for gas risk assessment. Data collected by novel types of measuring equipment may be deemed suitable by the Contaminated Land Team if they help reduce the monitoring period. Such equipment includes the 'GasClam', which is left *in situ* and gives real-time measurements of ground gases present in a borehole.

Where there is insufficient monitoring data, it is considered good practice to adopt a number of additional gas protection measures in developments. For small scale developments, such as extensions to existing buildings in the vicinity of potential gas sources, agreement between the Contaminated Land Team and the developer may be reached to dispense with ground gas monitoring and assessment.

In such cases, protection measures should be incorporated into the design, with the measures vetted by the Contaminated Land Team. Evidence of the installation should be supplied to the Contaminated Land Team and Development Control officer as verification the work was carried out.

Ground gas guidance gives action levels for methane and carbon dioxide above which certain types of protection measures are necessary. For example, NHBC uses a traffic light system whereby if monitoring data shows that methane exceeds 1% (volume/volume) and/or carbon dioxide exceeds 5% (v/v) a development site is considered *Amber 1*. Structures built on such as site would therefore require a reinforced concrete cast *in situ* floor slab with a minimum of 1200g damp proof membrane (capable of resisting gas) and underfloor venting. Refer to the NHBC guidance for more information on the traffic light system.

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<sup>12</sup> Available free to download from [www.ciria.org](http://www.ciria.org)

<sup>13</sup> Available free to download from [www.nhbc.co.uk](http://www.nhbc.co.uk)

<sup>14</sup> Available from [shop.bsigroup.com](http://shop.bsigroup.com)

## 5.6 Cover Systems

It is not uncommon for developers to use a simple cover system in gardens and landscaped areas in order to improve the amenity/quality of a site and to provide a suitable medium for plant growth. However, where a cover system is required to provide a safe and permanent barrier between any significant levels of contamination and residents/site users, an **engineered cover system** should be installed.

Reference can be made to Annex 8 of the NHBC guidance (2008)<sup>15</sup> which details options available to breaking the contaminant-pathway-receptor linkage. More technical guidance is available from CIRIA Special Publication (SP) 124 (1996) *Barriers, liners and cover systems for containment and control of land contamination*<sup>16</sup>. Generally, a conservative approach should be adopted to both engineered and simple cover systems.

Where an engineered cover system is chosen to act as a break in the pollutant linkage between the receptor and the hazard, in either garden or landscaped areas, a minimum depth of 600mm should be used. Typically, the 600mm would be expected to consist of:

- 150mm of uncontaminated topsoil
- 450mm of uncontaminated subsoil

In addition, a granular capillary break layer (100mm hardcore) and/or a suitable geotextile membrane should be placed beneath the cover system.

For planted landscaped areas, reference should be made to British Standard BS3882:2007<sup>17</sup> which recommends the following provision of suitable soils for healthy rooting and growth of plants: 450mm for grass, 600mm for shrubs, and 900mm for trees, with no more than 300mm being topsoil, the rest being clean subsoil/parent material.

When a cover system is used, a desk study should be provided with details of the source of the cover material. It should be demonstrated that the soil is free from contamination by supplying results of analytical tests. Justification for the analytical suite should be included. Sampling densities should be justified and based on the findings of a desk study. It would be expected as an absolute minimum that sampling would consist of at least three samples for each source used. The Contaminated Land Team recommends the following sampling density:

- 1 sample per 200m<sup>3</sup> – Greenfield/virgin source
- 1 sample per 50m<sup>3</sup> – unknown source/mixed source
- A minimum of 5 samples if the 95<sup>th</sup> percentile is to be calculated

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<sup>15</sup> *Guidance for the Safe Development of Housing on Land Affected by Contamination*  
R&D66: 2008 Volume 2 Appendices and Annexes

<sup>16</sup> Available from [www.ciria.org](http://www.ciria.org)

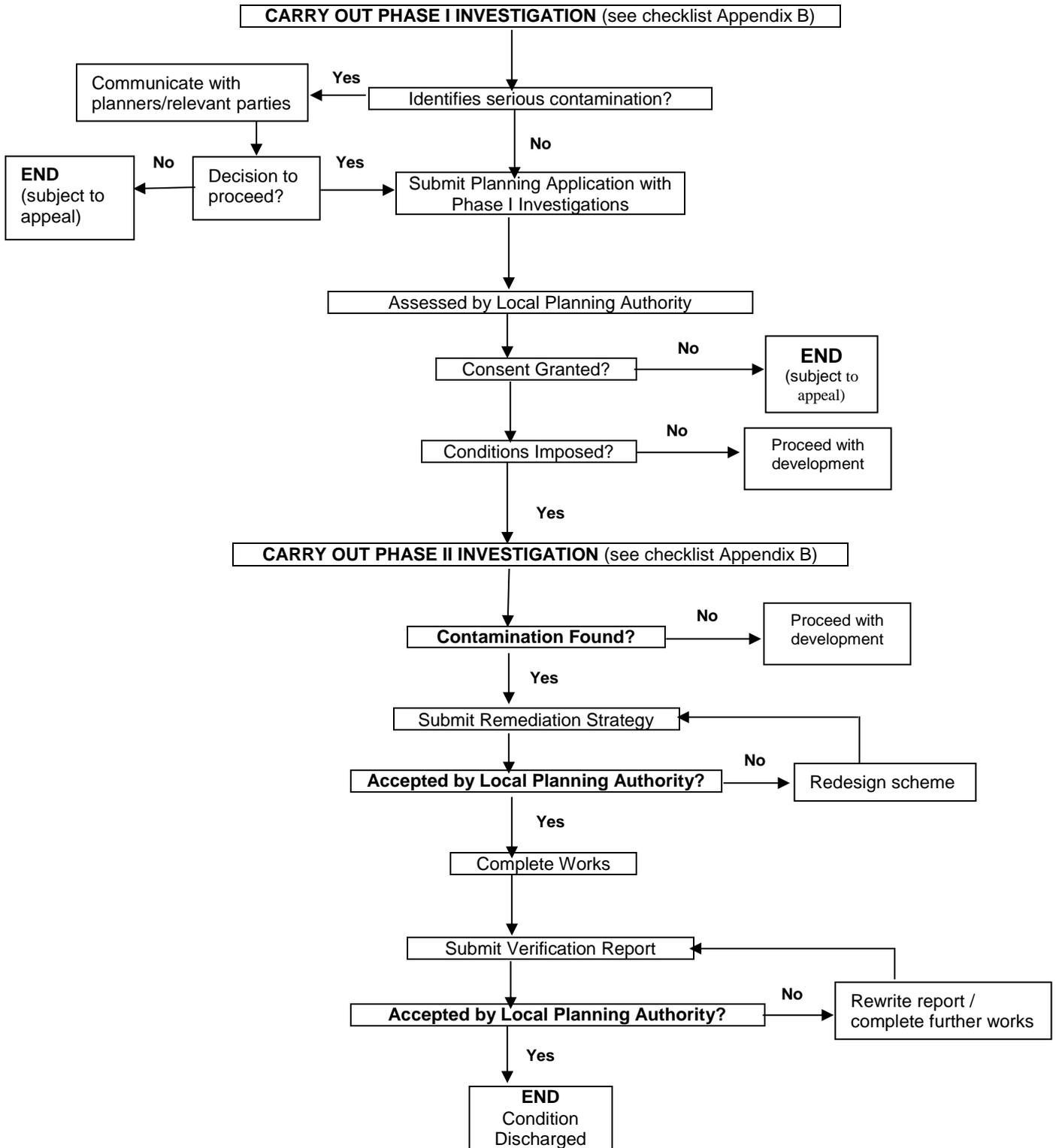
<sup>17</sup> Available from [shop.bsigroup.com](http://shop.bsigroup.com)

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- Many older Dept. of the Environment and CLR publications can be found a [www.eugris.info](http://www.eugris.info)

# APPENDIX A

## FLOWCHART ILLUSTRATING A TYPICAL EXAMPLE OF THE CONTAMINATED LAND PLANNING PROCEDURE



# APPENDIX B

## CHECKLIST OUTLINING THE INFORMATION REQUIRED IN SUPPORT OF A PLANNING APPLICATION<sup>18</sup>

<b>PHASE I INVESTIGATION</b>
<p><b>Desk Study</b></p> <ul style="list-style-type: none"> <li>• A site description.</li> <li>• A detailed site plan showing the site location, extent and boundary.</li> <li>• A review of historical information including copies of historical maps where available.</li> <li>• Background information on past and present uses of the site and its surrounding area.</li> <li>• Background information on the nature of any hazards and potential sources identified.</li> <li>• An appraisal of the site's environmental setting including:               <ul style="list-style-type: none"> <li>– Geology, hydrology and hydrogeology.</li> <li>– Information on coal workings and other extractive industries.</li> <li>– Waste management issues and landfill sites.</li> <li>– Water abstractions and discharges, pollution incidents, IPPC Part A and B processes, and radon.</li> <li>– Drainage and services.</li> </ul> </li> <li>• A review of previous desk studies or site investigations.</li> <li>• Risk screening by means of an initial conceptual model, which should generally include the following:               <ul style="list-style-type: none"> <li>– Contaminant(s) characterisation.</li> <li>– Migration pathway descriptions.</li> <li>– Environmental receptor identification and discussion.</li> <li>– Identification of potential contaminant linkages.</li> <li>– Description of the limitations and uncertainties inherent in the conceptual model.</li> </ul> </li> <li>• Recommendations and conclusions.</li> </ul>
<b>PHASE II INVESTIGATION</b>
<p><b>Site Investigation</b></p> <ul style="list-style-type: none"> <li>• Site investigation methodology including:               <ul style="list-style-type: none"> <li>– A clear investigation scheme, based on findings of desk study.</li> <li>– Methods of investigation with justification of the methodology and investigation techniques used.</li> <li>– Justification of exploration locations and a plan showing their position.</li> <li>– Sampling and analytical strategy.</li> <li>– Coverage of investigations (statistical significant – targeted and non-targeted).</li> <li>– Environmental monitoring including water sampling and gas monitoring/sampling.</li> </ul> </li> <li>• Results and findings of investigation including:               <ul style="list-style-type: none"> <li>– Ground, groundwater and gas conditions encountered</li> <li>– Presentation of laboratory analysis, sampling and monitoring results.</li> <li>– Discussion of any ground contamination (soil/gas/water) encountered.</li> </ul> </li> <li>• Refine conceptual model.</li> <li>• Qualitative and quantitative risk assessments (clearly identifying pollutant linkages).</li> <li>• Recommendations for remediation</li> <li>• Recommendations for further investigation (if required).</li> </ul>
<b>REMEDIATION STRATEGY</b>
<ul style="list-style-type: none"> <li>• Detailed outline of works to be carried out               <ul style="list-style-type: none"> <li>– Description of ground conditions.</li> <li>– Type, form and scale of contamination to be remediated.</li> </ul> </li> <li>• Consents, agreements and licenses (e.g. waste management issues) for proposed works.</li> <li>• Proposals for implementation and validation for remediation.               <ul style="list-style-type: none"> <li>– Use of on-site observations and visual evidence.</li> <li>– Chemical analysis/monitoring data.</li> <li>– Proposed clean-up standard.</li> <li>– Construction Quality Assurance.</li> </ul> </li> <li>• Proposals for maintenance and monitoring</li> </ul>
<b>VERIFICATION REPORT</b>
<ul style="list-style-type: none"> <li>• Details of works carried out and contamination encountered during investigation.</li> <li>• Details and justification of any changes from the original remediation strategy.</li> <li>• Demonstration of compliance and description of validation methods.               <ul style="list-style-type: none"> <li>– Laboratory and in-situ results.</li> <li>– Monitoring results for groundwater and gases</li> <li>– Summary data plots and tables relating to clean-up criteria</li> <li>– Plans showing treatment areas and details of any differences from the original remediation strategy.</li> <li>– Photographic and other media records.</li> <li>– Waste management details and records.</li> </ul> </li> <li>• Ongoing environmental monitoring of works to be carried out.</li> <li>• Confirmation that remediation objectives have been met.</li> <li>• Description of final site conditions.</li> </ul> <p style="text-align: center;"><b>(Where the development of a site is phased, separate verification reports may be needed for each phase)</b></p>

<sup>18</sup> Further checklist requirements can be downloaded for free from the Environment Agency website <http://publications.environment-agency.gov.uk/PDF/GEHO1109BRHA-E-E.pdf>

# APPENDIX C

## FREQUENTLY ASKED QUESTIONS

### **How much of the work can I do without employing a consultant?**

Simply determining whether land contamination is likely to be an issue is relatively straight forward. Researching the history and uses of a site at the local studies unit of a library and submitting information requests to South Ribble Borough Council and other agencies can be carried out by competent developers.

### **Can the Council advise on employing a consultant or contractor?**

South Ribble Borough Council cannot recommend any consultant or contractor. Lists can be found in telephone and trade directories. There are websites that may help to identify consultants and contractors with suitable experience. One such website is the Ends Directory: [www.endsdirectory.com/search](http://www.endsdirectory.com/search) which provides a one-stop guide to environmental consultancy and other services.

### **Who should I address correspondence to within the Council?**

Once a contaminated land condition has been placed on a planning consent, all correspondence relating to the subsequent assessment process should be directed to the Contaminated Land Team:

**Contaminated Land Team  
Environmental Protection  
South Ribble Borough Council  
Civic Centre  
West Paddock  
Leyland  
Lancashire  
PR25 1DH**

**Telephone: 01772 625 340**

A Contaminated Land Officer will then deal with the application and keep the appropriate Planning Officer informed of the progress to resolve the contaminated land issues.

### **When should I contact the Environment Agency?**

Although local authorities are the primary regulators of Part 2A, the Environment Agency assumes the role when contamination is found to impact on controlled waters. Therefore, if a development is likely to impact on either surface waters or groundwater, the advice of the Agency should be sought.

**Environment Agency  
Contaminated Land & Groundwater Section  
North West Region  
Lutra House  
Dodd Way  
Walton Summit  
Preston  
Lancashire  
PR5 8BX**

**Telephone: 08708 506 506**

# APPENDIX D

## USEFUL CONTACTS

### **British Standards Institute (BSI)**

389 Chiswick High Road  
London  
W4 4AL  
Tel: 020 8996 9001  
Fax: 020 8996 7001  
[www.bsi-global.com](http://www.bsi-global.com)

### **Construction Industry Research & Information Group (CIRIA)**

Classic House  
174 - 180 Old Street  
London  
EC1V 9BP  
Tel: 020 722 8891  
Fax: 020 7222 1708  
[www.ciria.org](http://www.ciria.org)

### **Department of the Environment, Food & Rural Affairs (DEFRA)**

Nobel House  
17 Smith Square  
London  
SW1P 3JR  
Tel: 08459 33 55 77  
[www.defra.gov.uk](http://www.defra.gov.uk)

### **Environment Agency (EA)**

Contaminated Land & Groundwater Section  
North West Region  
Lutra House  
Dodd Way  
Walton Summit  
Bamber Bridge  
Preston  
Lancashire  
PR5 8BX  
Tel: 08708 506 506  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

### **Land Contamination Specialists (SiLC)**

(Contact address c/o CIRIA)  
[www.silc.org.uk](http://www.silc.org.uk)

### **The National House Building Council (NHBC)**

NHBC House  
Davy Avenue  
Knowlhill  
Milton Keynes  
MK5 8FP  
Tel: 01494 735 363  
[www.nhbc.co.uk](http://www.nhbc.co.uk)