

Contaminated Land Technical Planning Guidance

**A Guidance Note for Applicants, Developers, Land Owners and Consultants
involved with Contaminated Land in the Borough of Blackburn with Darwen.**

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1.0 INTRODUCTION TO LAND CONTAMINATION

Land contamination can occur as a result of the historical use of any given site or surrounding land. It can also occur as a result of natural processes, such as the underlying geology etc.

There are many different perceptions of land contamination, and many different interpretations. Distinctions must be drawn between the legal definition of Contaminated Land, and Brownfield or Greenfield sites. This has been concisely defined in a recent Health Protection Agency¹ document, and is reproduced below:

- Contaminated Land is land that meets the definition set out in Part 2A of the Environmental Protection Act 1990², and does not automatically apply to land simply because it is known to contain contaminants
- Brownfield Land, or ‘previously developed land’, is the term generally used to describe post-industrial land that may have been subject to potentially contaminating land uses. This does not necessarily mean that the land will contain any chemicals associated with the previous use, or that it will be contaminated.
- Greenfield Land is a term reserved for land not previously developed. Greenfields, however, are not necessarily free from contamination. For example, they may have been used for uncontrolled waste disposal.

As the HPA succinctly state, “not all brownfield land will meet the statutory definition of contaminated land and not all contaminated land will be brownfield” (p2).

The legal definition of contaminated land is very prescriptive. As such, it is intended that only those sites that pose the most significant risk to human health, and/or the wider environment, are subject to the legal definition. Under Part 2A, if the land is determined as Contaminated Land, the potential cost implications for those who caused or knowingly permitting the pollution, and/or for the owner/occupier of the site, can be significant.

However, the Government’s preferred route to addressing any potential contaminated land issues is through voluntary action, rather than legal action. As such, the planning process (one of the ‘voluntary’ routes), has been used to tackle contamination issues at a large number of development sites.

¹ HPA, ‘An Introduction to Land Contamination for Public Health Professionals’, April 2009

² Can be accessed from the DEFRA website, www.defra.gov.uk

1.1 THE AIM OF THIS GUIDE

The purpose of this guide is to make applicants, developers and their advisors aware of the information that the Local Authority requires in order to assess potential contamination of any given development site, and to outline their roles and responsibilities.

Planning Policy Statement 23: Planning and Pollution Control³ (PPS23) explains the legal context for development on land which is potentially affected by contamination. It also explains the core policies, liabilities and responsibilities for all parties involved in development on potentially contaminated land. It should be consulted by all parties involved in the development of potentially contaminated land.

2.0 THE PLANNING PROCESS

The actual or possible presence of contamination is a material planning consideration. This means that contamination must be considered when assessing an application. As such, it will generally be helpful to determine whether there are likely to be any contamination issues on site prior to submitting an application for planning consent.

On any site where there is the potential for contamination to influence the site, the Planning Officer will consult with the Public Protection section. As a result of this consultation, the planning officer may make one of the following recommendations for planning applications on potentially contaminated sites:

- Consent is refused outright (this is very rare)
- Consent is refused and/or the decision deferred until further supporting information is provided
- Consent is granted conditionally⁴ requiring certain information to be provided and possibly remediation and validation works to be undertaken in order to discharge the condition(s)
- Consent is granted without conditions

In order to inform the recommendation of the Local Authority Officer, it is essential that the developer and their agents provide as much information to the Local Planning Authority (LPA) as possible, 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.

Where serious contamination is present, or is suspected, the LPA may refuse particular types of development. It may therefore save both time and money if a thorough pre-application consultation takes place prior to submission of a full planning application.

³<http://www.communities.gov.uk/planningandbuilding/planning/planningpolicyguidance/planningpolicystatements/planningpolicystatements/pps23/>

⁴ For full standard contaminated land conditions used by Blackburn with Darwen Borough Local Authority please see Annex 1

2.1 [PLANNING APPLICATION FORM AND CONDITIONS⁴](#)

The national standard planning application form, known as 1APP, includes questions regarding potential contamination issues on site. This is question 15, reproduced below:

15. Existing Use

Please describe the current use of the site:

Is the site currently vacant? Yes No

If Yes, please describe the last use of the site:

When did this use end (if known)?
DD/MM/YYYY
(date where known may be approximate)

Does the proposal involve any of the following:

Land which is known to be contaminated? Yes No

Land where contamination is suspected for all or part of the site? Yes No

A proposed use that would be particularly vulnerable to the presence of contamination? Yes No

If you have answered Yes to any of the above, you will need to submit an appropriate contamination assessment.

A guide, produced by Blackburn with Darwen Borough Council, indicating how these questions should be addressed, is included as [Annex 2](#). It is strongly recommended that this guide is consulted. Generally, as a minimum, a desk study and preliminary conceptual site model would be required if the answer is 'yes' to any of these questions.

The Local Authority may attach conditions to your planning consent where it is known or suspected that the site has a contamination problem, based on the IAPP form and any other information available. In line with PPS 23, a phased approach to the contaminated land conditions has been adopted:

A. Desk Study/Phase I Report

Phase I reports consist of a desk top study, site walkover, conceptual model and a basic hazard assessment. The desk top study comprises a search of available information including historical maps, aerial photos, internet searches, library searches, deeds etc. which can be used to identify the likelihood of contamination. A simple walkover survey of the site is conducted to identify if there are any obvious signs of contamination at the surface. Using the information gathered, a 'conceptual model' of the site is constructed and a basic hazard assessment is carried out. The conceptual site model (CSM) should ideally be presented in text, as well as plan and cross section forms, and should outline any assumptions and/or uncertainties in the model. **A very comprehensive desk study and CSM can negate the need for any further assessment.** In these cases, the condition can be considered satisfied at this point.

B. Intrusive Site Investigation/Phase II Report

A Phase II report will be required where potential pollutant linkages are identified in the initial CSM. The Phase II usually consists of an intrusive site investigation and risk assessment. These studies aim to reduce uncertainty in the original CSM, to characterise the contamination and to assess whether it will potentially result in harm. Relevant, appropriate and authoritative risk assessments should be included for each potential pollutant linkage under investigation. These may include generic assessment criteria, or the development of site specific assessment criteria, or a combination of the two. The CSM should be updated based on the further information available and resultant risk assessments, together with recommendations for further investigation, remedial and/or protective works where necessary.

C. Remediation Strategy

This is a document that details what actions are to be carried out so that the relevant pollutant linkages identified no longer present a risk to human health and/or the wider environment. It can include measures to break the pollution linkages, such as the removal of contamination, encapsulation to isolate the contaminants, treatment of the contaminants. Please note that Government policy encourages sustainable methods of remediation. This document should include details of the options appraised and the subsequent proposed remediation methodology and criteria, timescales, monitoring, validation methodology etc.

D. Verification Report/Validation

Where contamination has been found and/or remediated, the developer will be required to submit a Validation/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 Remediation Statement may be acceptable. Please **note** that the relevant condition will not be discharged until the verification report has been submitted and approved in writing by the LPA. Details to be included within verification reports can be found in CLR 11 and the EA (in prep). In addition, informal guidance has been produced by this authority, and is available on the website ([Contaminated land : Pollution : Environment and waste : Blackburn with Darwen Borough Local Authority](#)).

For ease of reference, a step chart, informal guidance and checklist have been included as [Annex 3-5](#). These contain further information on the completion of stages A to D above.

Stages A-C **must** be completed to the satisfaction of this authority, prior to construction works on site. Phase D **must** be provided prior to occupation of the site. It is important to note that not all phases will be required at all sites.

2.3 HOW TO ADDRESS THE CONDITIONS

There is a great deal of guidance available on how to undertake a contaminated land investigation. A list of useful sources is included as Annex 6. Blackburn with Darwen Borough Council would recommend, as a minimum, that the British Standard 10175:2001 and CLR11 are consulted when compiling contaminated land reports. A wealth of technical guidance is also available on the Environment Agency website ([Environment Agency - Land contamination](#)).

It is essential that a suitably qualified, appropriately competent, impartial expert is employed to undertake any contaminated land investigation.

Lists of potential environmental consultants that can undertake this type of work are available in the local phone directories, or at [ENDS Directory | Home](#) (www.endsdirectory.com)

2.4 REPORTS IN SUPPORT OF PLANNING APPLICATIONS

When submitting planning applications it is the applicant's responsibility to provide information on whether the site is contaminated. To aid the swift processing of planning applications for potentially contaminated sites, guidance on the content of supporting reports is provided in [Annex 4](#), and as a checklist in [Annex 5](#). The checklist is a guide to the matters to be addressed, depending on previous site uses and the extent of potential or actual contamination. The scope of submitted reports must reflect the size and complexity of the site, the necessary level of investigation, as well as likely contamination risks. Reports should be in a format consistent with BS10175:2001, section 10.

The listed requirements will enable the relevant officers to make informed decisions on the suitability of the proposed development and remediation schemes. Failure to include at least this level of information may result in requests for further information and hence significant **delays** in processing your application.

A list of key reference documents is also available in CLR 11, and on the Environment Agency website. These lists are not exhaustive.

Supporting reports should be prepared by appropriately qualified professionals. All reports should be sent directly to the relevant planning authority. The case officer will forward reports to the appropriate consultees for comment. Three copies of each report should be submitted in hard copy format per application. If possible, a CD-ROM or disk containing complete reports should also be included.

2.5 ENFORCEMENT OF CONDITIONS

If your investigations prove to the Local Authority's satisfaction that there is no contamination problem then no further action will be necessary. Once this has been confirmed by the Local Authority in writing you will then be able to proceed with your development. Contaminated land is a serious planning issue. **Legal action** can be taken by the Local Authority in cases of non-compliance.

Actions which can be taken by the Local Authority to enforce a contaminated land condition include the:

- Power to enter and investigate
- Power to stop the development if it is already in progress
- Requirement for post development remediation works prior to the site being put into use
- Ability to demand the information requested by the condition

It should also be noted that mortgage lenders, solicitors etc. frequently check with the Local Authority to determine whether the contaminated land condition has been satisfied.

The Local Authority may also ask for planning obligations to be placed upon a development. Planning obligations are one of the tools used by Local Authority's to achieve suitable development.

3.0 ROLES AND RESPONSIBILITIES

The Developer's Responsibility

The **responsibility** for all aspects of the development remains at all times with the **developer and their advisors**. Developers should therefore fully appreciate the importance of competent professional advice, supported by sufficient professional indemnity insurance. Developers and their advisors should be aware that actions or omissions on their part may result in liability under Part 2A of the Environmental Protection Act 1990. Blackburn with Darwen Borough Council is entitled to rely on the information provided by the developer, or to challenge it based on similarly qualified expert advice.

Blackburn with Darwen Borough Local Authority Public Protection Service

Public Protection is responsible for commenting on contaminated land reports and proposed remediation strategies. The Local Authority cannot accept responsibility for the thoroughness of reports or investigations nor the effectiveness of the design and completion of remediation measures. Reports will be considered by the Local Authority or by a suitably qualified professional working on behalf of the Local Authority. The Public Protection Service is responsible for recommending discharge of the contaminated land planning condition(s), although the final decision to discharge rests with Development Management.

Blackburn with Darwen Borough Local Authority Development Management

Development Management are responsible for attaching conditions, discharging conditions, and enforcing conditions attached to planning permissions. They are also responsible for permitting development.

The Environment Agency

The Environment Agency is a statutory consultee in England and Wales under the planning process on the matters for which it has regulatory responsibility. The Local Authority will consult with the Environment Agency on a range of issues under current planning guidance. These issues include applications where pollution of surface water or groundwater is possible, or where the development has waste management issues or IPPC license requirements.

All public bodies are responsible for dealing with requests for environmental information. Access to environmental information is primarily regulated by the Environmental Information Regulations 2004 and to a lesser extent, the Freedom of Information Act 2000. These regulations set out certain conditions and requirements for both the applicant and supplier of

information. The Regulations also allow a reasonable charge to be made for providing access to the information.

When requesting environmental information from the Local Authority, the following will help to save time:

1. Make the request in writing (or by fax) clearly stating the address of the site in question, and include a signed consent form.
2. Enclose a clearly marked up-to-date map showing the site and its boundaries
3. Ask specific questions rather than just a general request for information, for example: 'Are there any past industrial uses of the site?' or 'Is the site within 250m of a known landfill?' It should be noted that the larger the search area, the longer the search will take.
4. Make payment promptly when requested

The Environmental Information Regulations 2004 also impose a requirement to make information available to the public. As a result, you should be aware that information supplied in support of a planning application will be made available to the public if requested.

4.0 FREQUENTLY ASKED QUESTIONS

Can the Local Authority recommend a consultant or contractor?

The Local Authority 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, for example the ENDS directory. Applicants are warned that failure to satisfy the Local Authority's requirements will be treated seriously regardless of the cause. For further advice contact the relevant officer dealing with contaminated land issues (telephone Public Protection Service, Blackburn with Darwen Borough Local Authority, 01254 222540/520).

Do I have to do a desk study at every site, can't I just sample?

In line with current best practice and guidance, a desk study and preliminary conceptual site model must be provided for any site where the answer has been 'yes' to any part of question 15 of the IAPP form. This is regardless of the size and/or scale of the development. However, the Local Authority will endeavour to take a pragmatic approach in the review of these reports where the historical and environmental setting, coupled with the scale of development, suggest that the risk is low. For lower risk sites, a desk study may be all that is required to satisfy the condition(s).

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 straightforward. Researching the history and uses of a site and making enquiries of the Local Authority and other agencies are recommended. Once the need for detailed investigation is established, however, even desk studies can soon become complex and require specialist expertise.

How much will it cost?

The costs of addressing the condition(s) will depend entirely upon the work which is required, and the consultant employed. Blackburn with Darwen Borough Local Authority would advise that a comprehensive desk study and preliminary CSM is crucial to addressing the condition and avoiding delays to the application. The more information that is contained within this initial work, the more targeted any further work can be. Therefore, the overall time and costs can be reduced. Indeed, a comprehensive desk study can offset the need for any further works at all, and therefore a development can start much earlier. Often, by undertaking a perfunctory

desk study and subsequent sampling, more questions are raised than are answered. This can delay the discharge of the condition considerably, and add to the costs.

How long will it take?

Again, the time it takes to get a condition discharged will depend on a number of factors. This includes the work which is required, the consultant employed, the liaison with the local authority, and the cooperation of both the developer and/or agent with the consultant, and with the local authority. When information is withheld, or the developer is reluctant to pay for any additional works, delays can occur. Where reports are submitted which are below the standard expected from this authority, again delays can occur as the required information is sought. It is therefore imperative that any developer or agent employs a suitably qualified and competent consultant, liases closely with the authority and the consultant, and cooperates fully with the authority and the consultant.

The Local Authority has taken all reasonable precautions to ensure that the information contained in the Guidance is accurate at the time of publication, but the Local Authority, its officers, its servants or its agents cannot assume any legal responsibility for any loss or damage caused to any person relying on this information.

**ANNEX 1 BLACKBURN WITH DARWEN BOROUGH LOCAL AUTHORITY
STANDARD CONTAMINATED LAND CONDITIONS**

1. Prior to the commencement of construction works on site, the developer must submit to the Local Planning Authority (LPA) for written approval:
 - i. Two copies of a comprehensive desk study report, including a preliminary conceptual site model (CSM) in text, plan and cross-section form. Detailed proposals for subsequent site investigation based on the CSM shall be included as appropriate; the developer will be advised whether any further site assessment is required.
 - ii. If required by the LPA, two copies of the findings of the approved site investigation work, including an appropriate assessment of risks to both human health and the wider environment, arising from contaminants in, on or under the land (including ground gas) will be submitted. Where unacceptable risks are identified an updated CSM, remedial options appraisal and detailed remediation scheme shall be presented for approval. No deviation shall be made from this scheme without the written express agreement of the LPA.
2. As required and prior to the commencement of the permitted use, the developer must submit two copies of a comprehensive validation report to the LPA for written approval. The report shall demonstrate effective remediation in accordance with the agreed remediation scheme. All the installed remediation must be retained for the duration of the approved use and the LPA periodically informed in writing of any ongoing monitoring and decisions based thereon as appropriate.

REASON: To ensure that the site has been made 'suitable for use', and as such, does not pose a risk to future users of the site or the wider environment.

3. Should contamination be encountered unexpectedly during redevelopment, all works should cease, and the LPA should be immediately informed in writing. If unacceptable risks are identified, a remedial options appraisal and detailed remediation scheme should be presented, and agreed in writing by the LPA. No deviation shall be made from this scheme without the written express agreement of the LPA.

REASON: To protect the health of future occupiers of the site in accordance with Policy ENV3 of the Blackburn with Darwen Borough Local Plan.

INFORMATIVE:

- All reports shall be prepared in accordance with BS10175:2001, CLR 11, PPS23, and any other relevant, appropriate and authoritative publications.
 - The Local Planning Authority will not accept any liability for remediation works.
 - The responsibility for the safe development and occupancy of the site, at all times, rests with the developer.
 - Failure to comply with above condition may result in enforcement action being taken by the Local Authority under the Environmental Protection Act 1990.
 - You are strongly advised to contact the Environmental Protection Team of the Public Protection Service to discuss the requirements of the Contaminated Land Condition (Tel: 01254 222 520/540). The guidance documents entitled 'Contaminated Land Planning Guidance' & 'Validation Policy Document' should be read before you investigate the site. This guidance is available on the Local Authority web site
 - A suitably qualified, competent & impartial person shall fulfil the requirements of the condition.
-

ANNEX 2 1 APP GUIDANCE FOR CONTAMINATED LAND (QUESTION 15)

This guidance has been prepared to outline the planning submission requirements in relation to contaminated land.

There are specific questions in relation to contaminated land which are included on the 1APP form. The information presented in response to these questions will help inform the planning process, for example, whether a contaminated land condition is necessary.

However, it has become evident that many respondents have misunderstood the questions. As such, this Authority has issued the following guidance to help determine which response is appropriate, and to outline what information is required as a result.

The questions on the 1APP form are as follows:

15. Existing Use

Please describe the current use of the site:

Is the site currently vacant? Yes No

If Yes, please describe the last use of the site:

When did this use end (if known)?
DD/MM/YYYY
(date where known may be approximate)

Does the proposal involve any of the following:

Land which is known to be contaminated? Yes No

Land where contamination is suspected for all or part of the site? Yes No

A proposed use that would be particularly vulnerable to the presence of contamination? Yes No

If you have answered Yes to any of the above, you will need to submit an appropriate contamination assessment.

The questions highlighted above are those to which this guidance is aimed.

Question 1: Land which is known to be contaminated?

Where land has a known history of contamination, then this should be answered 'yes'. This could include sites where spills or odours have been noted, or where there have been previous site investigations which have identified contamination, but no remediation has been undertaken. It is not restricted to sites which have been determined as Contaminated Land under Part 2A of the Environmental Protection Act 1990.

Question 2: Land where contamination is suspected for all or part of the site?

If the site has previously been occupied by a potentially contaminative industry or land-use, then this should be answered 'yes'. Potentially contaminative uses include most factories or works (mills etc), gas works, landfill sites, former quarries etc. A more comprehensive list can be found in Table 2.1 of Planning Policy Statement 23: Annex 2 (PPS 23). The question should also be answered 'yes' if there is the suspicion of illegal dumping of waste, historical infilling etc.

Question 3: A proposed use that would be particularly vulnerable to the presence of contamination?

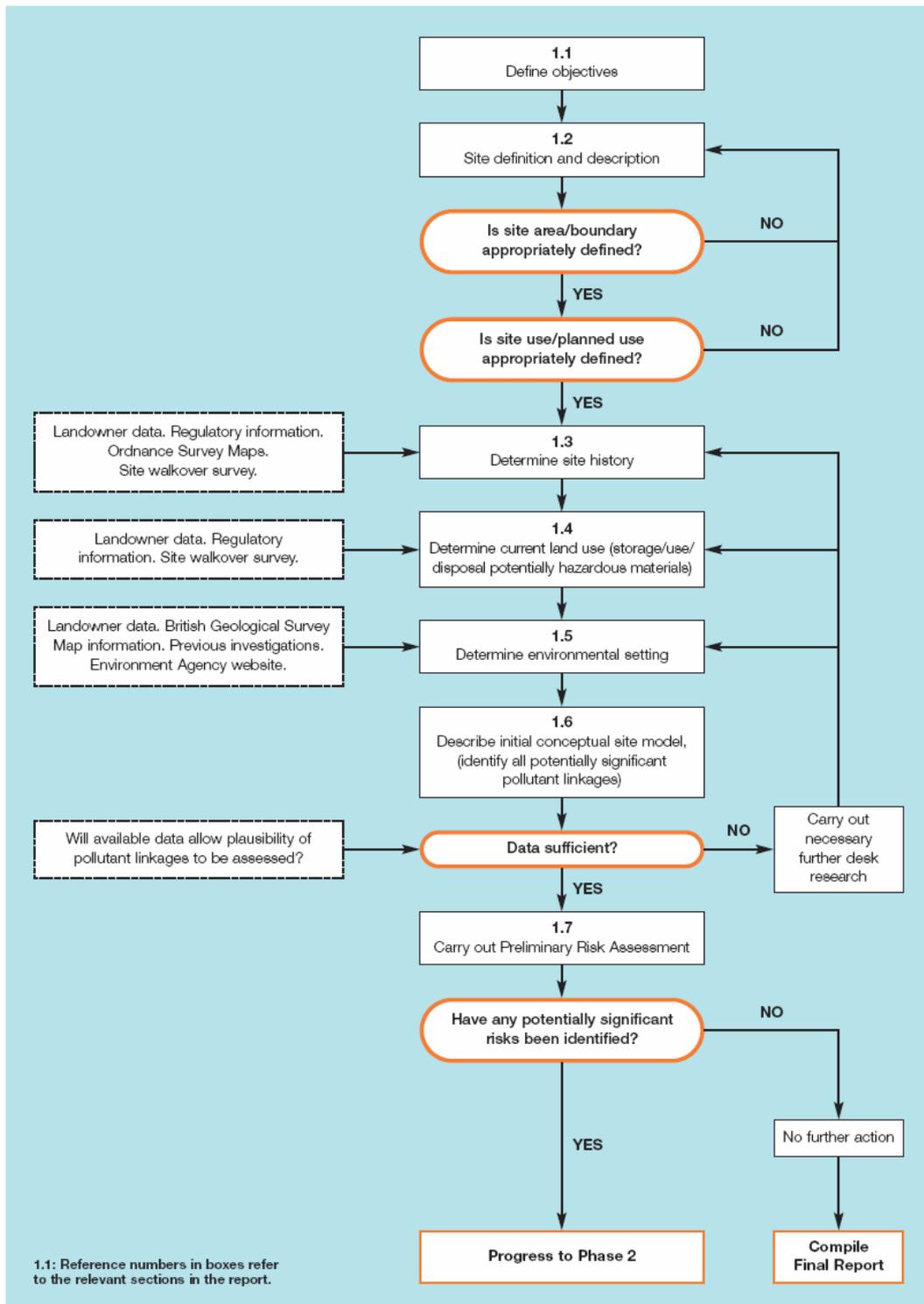
If the site is proposed to be developed for residential, schools, nurseries, allotments, hospitals etc., then these would be considered particularly vulnerable. Again, PPS 23 provides further information on the vulnerable end-use. In such cases, this question should be answered 'yes'.

Where one or more of the above questions has been answered 'yes', then the following information is required:

A comprehensive desk study and conceptual site model will be required. There is a great deal of advice and guidance on the content of the report and the format of the conceptual site model. This includes, but is not limited to, BS10175:2001, available from the BSI, CLR 11 and R&D 66, both available free of charge on the Environment Agency website, PPS 23, and the Blackburn with Darwen Borough Local Authority Guidance, available free of charge on the Public Protection website.

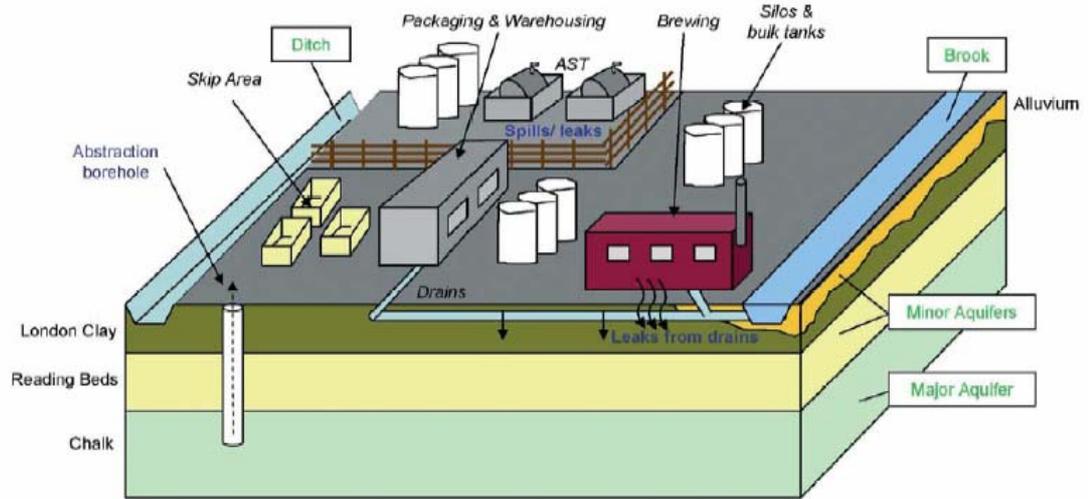
A summary of their requirements is provided in chart 1 (below):

Chart 1 Phase 1: Hazard identification and assessment



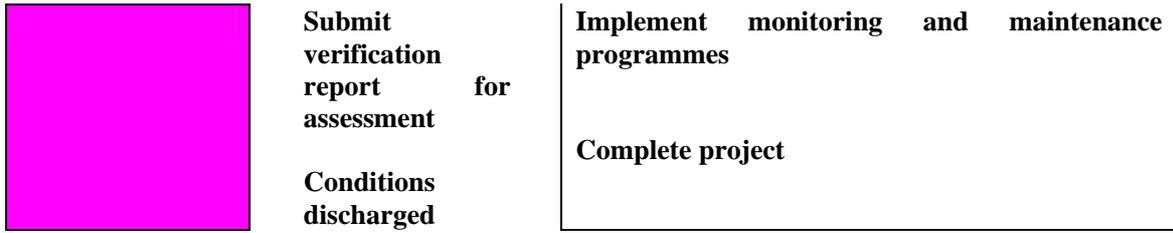
Conceptual Site Model Example:

Figure 1.2 Example initial conceptual site model



ANNEX 3 SITE INVESTIGATION & REMEDIATION STEP CHART

A PHASE I REPORT	Consult Local Authority and other relevant parties	STEP 1 Establish former uses of the site Collect physical data and undertake walk-over survey
		STEP 2 Identify contaminants of concern List industries identified in Step 1 including industry specific contaminants and geologically-based contaminants
		STEP 3 Develop conceptual model of the site
	Submit planning application with desk study	STEP 4 Undertake Hazard Assessment. Review data and conduct exploratory investigations if further information is required
B PHASE II REPORT	Consult Local Authority and other relevant parties	STEP 5 Design and implement ground investigation Update Step 3
		STEP 6 Undertake risk estimation. Obtain generic assessment criteria or calculate site-specific criteria
	Submit report for assessment	STEP 7 Undertake risk evaluation. Identify unacceptable risks from comparison of measured concentrations with appropriate criteria. Update conceptual site model.
C REMEDIA TION STATEMENT	Consult Local Authority and other relevant parties	STEP 8 Identify and evaluate options for remedial treatment based on risk management objectives
	Submit report for assessment	STEP 9 Select preferred remedial strategy and submit for approval
D SITE VERIFICATION REPORT	Consult Local Authority and other relevant parties	STEP 10 Design and implement remedial works Undertake verification of remedial action
		STEP 11



Modified from Figure 2.1 from the Environment Agency R & D Publication 66 (see references)

ANNEX 4 GENERAL INFORMAL SITE INVESTIGATION (PHASE I & II), RISK ASSESSMENT, REMEDIATION & REPORT FORMAT ADVICE

The report should contain a written statement about the objectives set for the site investigation. The objectives should be specific to the site in question, rather than generic.

Generally the objective of a site investigation is to gather information needed to form a conceptual model in order to be in a position to assess the presence and significance of contamination of land. The resultant information then enables the risk assessment to be carried out to conclusions in which an acceptable degree of confidence can be placed. At any stage of the investigation the overall objective will be to characterise the contaminants present and to identify pathways and receptors for the purposes of the risk assessment. The information required to carry out the risk assessment to a robust conclusion should be identified before designing or planning an investigation.

1.0 Desk Study (see BS10175:2001, sections 5 & 6)

The desk study should ideally be submitted as a separate phase one report. It should comprise a combination of documentary research and consultations. The desk study should cover the following topics, where appropriate:

- Current ownership & occupation/use of the land
- Details of the use of the site
- The size and location of the site
- The history of the site and adjoining areas. Particular attention should be paid to the nature of any industrial processes or other activities on the site that could have potentially contaminative or could have modified the ground structure to create potential migration pathways;
- Any previous desk study or investigation of the site,
- The geological, geochemical, hydrogeological, archaeological and ecological setting of the site;
- Potential receptors of contamination (for example, current and intended users, trespassers, surface waters, groundwater or nearby water abstractions, property);
- The proximity of any licensed or unlicensed waste disposal sites or other sources of contamination including hazard gases, that could have an impact on the site;
- The existence of naturally occurring harmful materials such as radon or naturally enhanced concentrations of harmful substances;
- The presence of any mining activities
- Any constraints on an intrusive site investigation (access, underground services, obstructions).
- Susceptibility to flooding

In order to retrieve the above information, the following sources should be consulted (this list is not exhaustive):

- Current and historical maps
- Current and historical aerial photographs
- Trade directories
- Planning Department and/or register details

- Environmental Health records
- Authorisation documents eg. PPC, discharge consents
- Pollution incidents within the vicinity and on site, emergency response records (eg. explosion, fire, spillages)
- Anecdotal evidence from discussions with current and past landowner, site occupiers etc.
- Archive/library information
- Industry profiles
- BGS borehole records
- Service plans
- Building control records with a view to control measures, special construction measures etc.
- World wide web search
- Public registers

It should be noted that the report should detail all sources consulted in the compilation of the desk study, even if no useful information was gleaned or data was not available. Over reliance should not be made on past historical maps since they may not represent a complete historical record.

A site reconnaissance should be undertaken wherever possible, after the documentary research phase. This should include, & record, as far as possible:

- The date of the walkover
- The weather conditions during the walkover
- A description of the vicinity of the site, including any relevant street names, pub names, adjacent land use, any signs of remedial measures & site investigations, topography etc.
- The location and condition of buildings/structures on site
- Any hazard signs
- Features suggesting current/former use
- Any tanks and their condition
- Any outfalls to surface water
- Any remains of previous site investigations on site, and their locations
- Fences/security features
- Depth of standing water, direction and rate of flow of any water features
- Any services on site
- Site condition in relation to surrounding areas
- Any deposits, fly tipping etc.
- Unusual smells, surface staining etc.
- Highly coloured soil/deposits
- Possible polluted water, gas bubbling through water
- Bare ground and/or distressed vegetation
- Lack of species diversity etc.

- Any evidence of underground combustion

Taking photographs during the site walkover will greatly assist in the presentation of the information obtained during the walkover. The location of specific features on site should be recorded on a site plan. All information obtained from the walkover should be presented within the report.

1. Conceptual Site Model (BS10175:2001, section 6.3)

A conceptual model should be formed following the completion of the desk study. With regard to conceptual models, the following guidance may be helpful:

- British Standard 10175:2001 Investigation of Potentially Contaminated Sites, Code of Practice, BSI (London)
- Detailed Inspection of Radioactive Contaminated land Under Part IIA EPA 1990, (ea/br/e/std/vr100thanni)
- Environment Agency 1999b. Guide to good practice for the Development of Conceptual Models and the selection and Application of Mathematical Models of Contaminant Transport Processed in the Subsurface, National Groundwater and Contaminated Land Centre (NGWCLC) Report NC/99/38/2. Available from the NGWCLC, Environment Agency, Olton Court, 10 Warwick Road, Solihull, B92 7HX and from <http://www.environment-agency.gov.uk>
- Nathanail, J., P. & Nathanail, C.P. 2002. Contaminated Land Management Ready Reference. Epp Press, London & Land Quality Press, Nottingham.

BS10175:2001, section 6.3.1, states that ‘the initial conceptual model should identify, as far as possible:

- Potential types and depths of contamination present in different zones of the site
- The likely vertical and stratification of natural and manmade layers beneath the site
- Strata variability in different areas of the site, and their relative permeability, both vertically and horizontally
- Potential migration routes
- The presence of service trenches, drainage runs, USTs, former foundations, and other physical features that might influence the occurrence or migration of contamination.
- The occurrence of any biological, chemical or physical processes that might affect contaminant concentrations and migration
- The characteristics of groundwater bodies beneath the site
- Other potential receptors’

Additional information should include the potential age of the contamination, and therefore the degradation potential and any associated daughter products which may be on site. This will inform the selection of the analytical suite.

The conceptual site model, should, as far as possible, include all the information obtained from the desk study and site walkover. Any omissions and/or assumptions should be clearly stated and justified.

A conceptual model can be presented in a variety of ways, but usually comprises a mixture of pictures or diagrams, and text. Typically, it comprises a plan and cross section of the site together with text to amplify the information presented in the figures. It may also include block diagrams, or occasionally, mathematical models.

For the purposes of Part 2A, the Environment Agency state that “the conceptual site model must comprise:

- A textual explanation of the potential pollutant linkages identified and their constituent parts
- A summary table
- A site plan and schematic cross section diagram (if appropriate) presenting likely contaminant distribution, migration pathways and receptor locations

The conceptual site model is not complete unless all three elements are provided”.

By setting out the conceptual model in this way it is easy to identify the additional information needed to confirm the presence of actual pollutant linkages, and to evaluate the significance.

Where possible this Department would encourage the production of a site specific CSM rather than a generic CSM. It would be expected that the sources be specified along with the associated contaminants, the receptors at risk i.e. human (0-6 year old child, or 16-65 year old female etc), and all viable pathways be grouped for each contaminant. Where possible, the CSM should include a pictorial diagram of the site.

The conceptual model should list uncertainties in the information and any assumptions made. These uncertainties and assumptions will inform the next stage of the investigation if these gaps in knowledge have an impact on the interpretation of the model.

2. Sampling Strategies & Site Investigation (BS10175:2001, section 7 onwards & including annexes)

If a pollutant linkage is suspected, then additional information from further enquiries and/or a site investigation will be required. The investigation should aim to reduce uncertainty in the conceptual model to the extent needed to allow a decision to be reached. This additional information is used to revise the conceptual model and support an assessment of the risks to relevant receptors – human health, controlled waters, ecosystems, or buildings and structures. A reduction in the uncertainty within the preliminary conceptual site model will increase the confidence that can be placed in the resultant risk assessment. It is therefore imperative that, where necessary, a comprehensive, justified site investigation is undertaken and presented.

Ideally, every site investigation should have a clear sampling strategy. There should be a specific, stated reason for each sample collected. The strategy should be written before the site investigation and be included within the final report. It should state the purpose(s) of the sampling and be linked to the uncertainties identified in the initial conceptual model and the data quality objectives set by the intended risk assessment.

Advice on sampling strategies can be found in R & D Technical Report P5-066/TR ‘Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination, Environmental Agency 2000’, and in BS10175:2001, section 7 onwards (including annexes).

Please note this Department requires a full and detailed explanation of the design of the site investigation including a description of the uncertainties and limitations of the work carried out. It would also be beneficial to assess the statistical confidence that can be placed in any non-targeted sampling. Advice on this can be found in R & D Technical Report P5-066/TR ‘Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination’, Environmental Agency 2000 and CL:AIRE Technical Bulletin March 2004 & November 2006.

The methodology and rationale behind the site investigation must be clearly presented within the final report. It must be site specific. Failure to provide this information is likely to result in the report being deemed inadequate. Further sampling may therefore be necessary, and the resultant project may be severely delayed.

The sampling strategy adopted should be directly linked back to the preliminary conceptual site model. For example, where human health is a receptor of concern, sampling may be targeted at the top 0.5m of the sub-surface. Where the water environment is a concern, deeper samples may be necessary in order to evaluate impacts on the groundwater. In nearly all site investigations, multiple samples from the vertical profile at each sampling point will be required. In this way, a more three-dimensional picture of contamination on site can be determined.

The risk assessments are based on the results of the sampling strategy. The strategy should therefore be defensible in relation to the preliminary conceptual site model and risk assessments. Where the sampling strategy has no obvious link back to the preliminary conceptual site model, the strategy is likely to be rejected, as little or no confidence can be placed in the risk assessment.

When applying a grid sampling strategy, statistical interpretation of the results would be expected. The grid should be presented in a plan of the site, showing the intended sampling points, grid scale etc.

The analytical strategy contains the approach adopted to determine the chemical composition of the media of interest at any given site. Again, the choice of analytical strategy has a major impact on the outputs of any risk assessment. The aim of the analytical strategy is to provide data for use in risk assessment. The desk study and site inspection will provide the main information used to select what substances and properties to test for.

3. Human Health Risk Assessment

A risk assessment is required to establish whether the pollutant linkage is significant. This, in general, could involve a qualitative risk assessment based on an interpretation of the conceptual model, followed by a quantitative risk assessment. The qualitative assessment considers the potential linkages between the sources and receptors. Some potential significant pollutant linkages will be identified for further assessment, while others could be excluded on the basis of their being implausible or insignificant.

Quantitative risk assessments are carried out in a sequence of ever increasing data quality, focusing in on specific potential pollutant linkages. This sequence may be described as a series of steps or tiers:

- Comparison against generic assessment criteria
- Comparison against site specific assessment criteria
- Execution of further site investigation work to measure some of the parameters e.g. SOM

When using generic guideline values, the assessor is required to demonstrate that they are 'appropriate, authoritative and scientifically based'¹². All risk based guideline values have been derived from an assumed conceptual model of a generic site. The conceptual model is usually a reasonably worst case scenario and will incorporate a range of assumptions relating to:

- The soil type and conditions
- The contaminant and its form and toxicity
- The location and size of the contaminated area
- The physiological and behavioral characteristics of the critical receptor
- The exposure pathways through which the critical receptor is exposed to the contaminant

The choice of generic value must always be justified with reference to the conceptual model for the site in question. The assumed conceptual model underpinning the CLEA v1.06 Soil Guideline Values is most comprehensively described in the 'Updated Background to the CLEA Model' (Science Report SC050021/SR3) (DEFRA and Environment Agency 2008).

With regard to guideline values from other countries, there are a number of reasons why the generic assessment criteria developed for soils in one country do not directly transpose to another country. Generic assessment criteria may have been developed for different uses, dependent on policy and legal context. The generic site considered may differ with respect to the site conditions, the pathways and/or the receptor. Further, the level of acceptable risk is a matter of policy, rather than science, and the acceptance of a substance as a known carcinogen, as well as the treatment of that substance, varies between countries. As such, the direct application of foreign guideline values will not be accepted by this authority.

Where there is no appropriate guideline value available or the contaminant exceeds the generic guideline value, then it would be appropriate to derive site specific assessment criteria. There are many commercially available risk assessment tools that can be used to derive site specific assessment criteria. It should be noted that tools are constantly reviewed and updated, and not all tools are appropriate for every site. You will need to consider:

- Which exposure pathways have been modeled and which algorithms have been used.
- What exposure assumptions have been made;
- What toxicological information and contaminant physicochemical properties have been selected?
- What representative contaminant concentration has been compared with the site-specific criterion?

The Environment Agency has provided a number of fact sheets relating to some of the different commercially available risk assessment tools. These are available on their website. Furthermore, the Agency has included a section on the FAQ pages of the contaminated land section of their website which outlines the approach which should be taken where no SGVs are available. This is the approach that should be adopted by risk assessors, and is the approach encouraged by this Department.

The introduction of CLEA v1.06, allows GAC and SSAC to be generated. CLEA v1.06 is based on UK Policy, and is therefore currently one of the most appropriate tools to apply. Moreover, generic assessment criteria, such as those produced by the CIEH & LQM, may be wholly more appropriate than the application of foreign guideline values.

4. Controlled Waters Risk Assessment

Under Part 2A of the Environmental Protection Act 1990, if substances in, on or under the land are giving rise to pollution of controlled waters then the land could be designated as being statutorily contaminated.

‘Controlled water’ includes groundwater, perched groundwater, surface waters and surface water run-off. As there are no water quality standards established for groundwater, it is assumed that the most appropriate Environmental Quality Standard (EQS) or Drinking Water Quality Standard (DWS) will be protective of groundwater. It should be noted that these standards are not necessarily remediation targets.

The assessor would be required to illustrate, via the conceptual model, whether or not there are any substances in, on or under the land which could rise to pollution of controlled waters.

Currently, there is no ‘significance’ test in England in relation to the pollution of controlled waters. As such, wherever there is the potential for pollution of controlled waters occur, or where the pollution of controlled waters is occurring, this authority will consult with the Environment Agency regarding the risk assessment.

5. Ground Gas Risk Assessment

Useful guidance in this regard includes the CIRIA documents 131, 149, 151 and 152, the BRE report 212, Wilson and Card (1999) Reliability and Risk in Gas Protection Design, Ground Engineering, the NHBC and Nathanail, Bardos and Nathanail (2002) Contaminated

Land Management Ready Reference, EPP Publications, Land Quality Press. More recently, CIRIA C665 and BS8485:2007 have been introduced. It is expected that these will be the primary reference source when compiling ground gas risk assessments. Risk assessors should be aware that the guidance provided in papers such as WMP27 has now been superseded. This is because WMP27 does not adopt a risk based approach, and is therefore not in line with current best practice.

The above references emphasise the need to understand the gas regime on site when evaluating the results of gas surveys. Specific attention should be given to the potential sources of ground gas on site, as well as the monitoring regime on which the assessment is based.

The guidance presented above also includes an assessment of remedial measures, and the applicability of certain measures in certain situations.

Consideration should be given to the source(s) of the ground gas, the flow rates, and to measurements in worst case scenarios, eg. Falling atmospheric pressure. Depleted oxygen levels require discussion, including the cause of these levels. With regard to the frequency, duration and number of monitoring events, CIRIA C665 outlines the general minimum ground gas monitoring regimes for different land-use scenarios, dependent on the potential ground gas source. As a rule, monitoring periods of less than 3 months, with fewer than 6-10 monitoring visits, would not be accepted by this authority for residential developments, in line with the NHBC guidance²⁰. It should be noted that monitoring programs of between 6 months and 2 years are not uncommon. Where gas is suspected on sites, this should be taken into account when planning development, in order to prevent costly delays.

Not every site will require ground gas monitoring. This decision can only be made on a site specific basis, and will be dependent on a number of factors which should be clearly illustrated in the conceptual site model. In general, this Department would discourage the pre-emptive fitting of gas protective measures without monitoring.

Justification is always required for the gases monitored in accordance with current published guidance.

8.0 Recommendations/Remedial Strategy

Ultimately, some form of remediation and/or protective measures may be necessary in order for a site to be made suitable for its current use, or in the case of development, the proposed new use. These recommendations should be clearly set out along with an explanation as to how they will break the pollutant linkages already identified. A revised conceptual model would be appropriate at this stage.

Where the report is being submitted as part of a planning application, or to satisfy a condition of planning, the remedial/protective measures should be submitted as a separate schedule, so that it can be agreed to by the Planning Authority.

9.0 Verification/Validation

It should be noted that in order to fulfil the standard planning condition relating to land contamination that this Authority uses, a completion report would also be required. The completion report should contain details of the actual remediation carried out, and any protective measure incorporated. It should also include details of any validation sampling. It is also good practice to include the revised CSM that shows that all the pollutant linkages are broken. This authority has provided separate validation guidance which should be adhered to as far as possible (see www.blackburn.go.uk) Photographic records of remediation should be included.

10.0 Report Format (BS10175:2001, section 10)

Section 10 of the British Standard (BS10175:2001) provides guidance on the format of any report. Generally speaking, all assumptions should be discussed and fully justified. The limitations and any uncertainties should also be fully discussed. The preliminary investigation should be reported in such a way that the CSM stands out as a clearly recognisable element. The preliminary investigation should include information collected on past and present uses of the site together with details of geology, archaeology, ecology, hydrogeology, hydrology and geochemistry. A list of all sources that have been consulted should be included, even if no useful information was obtained. Indications should also be given of any possible gaps in the information; there should then be a full discussion of the information obtained. This should lead into a description of the CSM that has been formulated, included conclusions relating to the presence (or absence), type and nature of contamination, its spatial distribution, and details of any division of the site into sub-areas for which different hypotheses have been formulated.

This Authority would take this opportunity to stress that the responsibility for the safe development of the site rests with the developer. Actions or omissions on their part may lead to liability being incurred under Part 2A. Those providing expert advice to developers should be aware of the future reliance that may be placed on it. For example, should the site be considered under Part 2A in the future, the decisions and advice of the consultant may come under legal scrutiny. Therefore, the assessor must remain, at all times, professional & impartial.

ANNEX 5 SITE INVESTIGATION & REMEDIATION CHECKLIST

A. PHASE I REPORT

Tick when actioned

Has the following been considered?

- (i) Purpose and aims of study
- (ii) Site location and layout plans
- (iii) Appraisal of site history and previous uses of the land surrounding the site
- (iv) Assessment of environmental setting, to include:
- geology, hydrogeology, hydrology
 - information on coal workings and other mining or quarrying activities
 - information from Environment Agency on abstractions, pollution incidents, water quality classification, landfill sites, etc.
 - Information from Local Authority on pollution incidents, prescribed processes, hazardous substances, former landfill sites, private water supplies, contaminated land, etc.
- (v) Assessment of current site use and surrounding land uses
- (vi) Review of any previous site contamination studies (desk-based or intrusive) or remediation works
- (vii) Preliminary (qualitative) assessment of risks based on proposed site use
- Appraisal of actual and/or potential contaminant sources, pathways and receptors
 - Conceptual site model (visual and written)
- (viii) Recommendations for intrusive contamination investigation, if necessary
- (viii) Site Walkover

B. PHASE II REPORT

Has the following been considered?

- (i) Review of any previous site contamination studies (desk-based or intrusive) or remediation works
- (ii) Site investigation methodology
- methods of investigation
 - plan showing exploration locations
 - justification of exploration locations
 - sampling and analytical strategies
-

(iii) Results and findings of investigation

- ground conditions (soil, gas and water regimes, including made ground) ■
- discussion of soil/gas/water contamination (including visual, olfactory, analytical and monitoring data) ■

(iv) Conceptual site model (visual, written – changes?) ■

(v) Risk assessment – as a minimum, based on source-pathway-receptor model. Should take account of the severity of consequences and likelihood of occurrence. Justification of any Risk Assessment models used. Where necessary, a suitable quantitative risk assessment may be required. ■

(vi) Recommendations for remediation – justification should relate to proposed site end use, risk assessment findings, as well as technical and financial appraisal ■

(vii) Recommendations for further investigation (if necessary) ■

C. REMEDIATION STATEMENT (submitted before remediation)**Has the following been considered?**

(i) Objectives of the remediation works ■

(ii) Detailed outline of the works to be carried out

- Description of ground conditions (soil, gas, water) ■
- Type, form and scale of contamination to be remediated ■
- Remediation methodology, including remedial, protective or other works ■
- Site plans/drawings ■
- Phasing of works and approximate timescales ■

(iii) Consents, agreements and licences (discharge consents, waste management licence, etc.) ■

(iv) Site management procedures to protect site neighbours, environment and amenity during works, including where appropriate

- Health & safety procedures ■
- Dust, noise & odour controls ■
- Control of surface run-off ■

(v) Details of how any necessary variations from the approved remediation statement arising during the course of works will be dealt with, including notification to the relevant planning authority or officer dealing with contaminated land issues (contact details can be found on the back page of this guidance note). ■

(vi) Details of how the works will be validated to ensure the remediation objectives have been met, should include details on;

- Sampling strategy
- Use of on-site observations, visual/olfactory evidence
- Chemical analysis/monitoring data
- Proposed clean-up standards (i.e. contaminant concentrations)

D. SITE COMPLETION REPORT (submitted following remediation)
Has the following been considered?

(i) Include information as per C(i) to C(vi)

(ii) Details of who carried out the work

(iii) Details and justification of any changes from original Remediation Statement

(iv) Substantiating data – should include where appropriate

- Laboratory and in situ test results
- Monitoring results for groundwater and gases
- Summary data plots and tables relating to clean-up criteria
- Plans showing treatment areas and details of any differences from the original Remediation Statement
- Photographic and other media records
- Waste management details and records

(v) Confirmation that remediation objectives have been met

Please note:

General recommendations for remediation made in the Phase II Report will not be accepted as a substitute for a Remediation Statement.

ANNEX 6 KEY REFERENCE DOCUMENTS

1. British Standards Institution, 2001, BS10175, **Investigation of Potentially Contaminated Sites – Code of Practice and its Investigation**
2. British Standards Institution, 2007, BS8485:2007, **Code of Practice for the Characterisation and Remediation from Ground Gas in Affected Developments**
3. Chartered Institution of Environmental Health, 2001, **Local Authority Guide to the Application of Part IIA of the Environmental Protection Act 1990**. (Available on-line at: <http://www.cieh.org/research/environment/epalaguide.htm>)
4. CIRIA, 2007, C665, **Assessing Risks Posed by Hazardous Ground Gases to Buildings**
5. Environment Agency [Environment Agency - CLEA publications](#)
6. Department of the Environment, 2004, CLR Report 11, **Model Procedures for the Management of Land Contamination**
7. Department of the Environment, 1994, CLR Report No 1, **A framework for assessing the impact of contaminated land on groundwater and surface water**
8. Department of the Environment, 1994, CLR Report No 2, **Guidance on Preliminary Site Inspection of Contaminated Land**
9. Department of the Environment, 1994, CLR Report No 3, **Documentary Research on Industrial Sites**
10. Department of the Environment, 1994, CLR Report No 4, **Sampling Strategies for Contaminated Land**
11. Department of Environment, Transport and Regions, 1997, CLR Report No 12, **A Quality Approach for Contaminated Land Consultancy** [section 3.4 'Reporting'].
12. Department of Environment, Transport and Regions, 2000, **Guidelines for Environmental Risk Assessment & Management**, Revised Departmental Guidance
13. Department of Environment, Transport and Regions, Circular 01/2006 **Contaminated Land: Implementation of the Part IIA of the Environmental Protection Act 1990**. (Available on-line at: <http://www.defra.gov.uk/environment/landliability/pubs.htm>)
14. Environment Agency, 2006, **Verification of Remediation of Land Contamination**, NC/00/38/SR consultation document
15. Environment Agency & NHBC, 2000, R&D Publication 66, **Guidance for the Safe Development of Housing on Land Affected by Contamination**
16. Environment Agency, 2000, **Secondary Model Procedure for the Development of Appropriate Sampling Strategies for land Contamination**, R&D Technical Report P5-066/TR
17. Environment Agency, 1999 (revised 2006/7), R&D Publication 20, **Methodology for the Derivation of Remedial Targets for Soil and Groundwater to Protect Water Resources**
18. Harris, M R & Herbert, S H, 1994, ICE Design & Practice Guide, **Contaminated Land: Investigation, Assessment & Remediation**
19. Harris, M R, Herbert, S M & Smith, M A, 1995-1998, CIRIA Special Publications 101-112, **Remedial Treatment for Contaminated Land, 12 Volumes**
20. Health & Safety Executive, 1991, **Protection of Workers & the General Public during the Development of Contaminated Land**
21. National House Building Local Authority (NHBC), 2007, **Guidance on Evaluation of Development Proposals on Sites Where Methane and carbon Dioxide are Present**, Report Edition No. 4
22. National House Building Local Authority (NHBC), 1999, NHBC Standards Chapter 4.1, **Land Quality – Managing Ground Conditions**
23. Office of the Deputy Prime Minister, 2002, **Development on Land Affected by Contamination Consultation Paper on Draft Planning Technical Advice**. (Available on-line at: <http://www.planning.odpm.gov.uk/consult/contamin/index.htm>)
24. Office of the Deputy Prime Minister, 2004 **Planning Policy Statement 23: Planning and Pollution Control** (available from the ODPM, or online at www.planningportal.gov.uk)

Please note that reference document 6 contains a comprehensive list of key publications associated with contaminated land.

ANNEX 7 USEFUL CONTACTS

The Association of Greater Manchester Authorities

www.agma.gov.uk

British Standards Institute (BSI)

389 Chiswick High Road
London
W4 4AL
Tel: 020 8996 9001
Fax: 020 8996 7001
www.bsi-global.com

Construction Industry Research & Information Group (CIRIA)

6 Storey's Gate
Westminster
London
SW1 P 3AU
Tel: 020 722 8891
Fax: 020 7222 1708
www.ciria.org.uk

Department of Environment, Food and Rural Affairs (DEFRA)

3/B4 Ashdown house
123 Victoria Street, London
SW1 6DE
Tel: 020 7944 5287
Fax: 020 7944 5279
www.defra.gov.uk

Environment Agency (EA)

Appleton House,
430 Birchwood Boulevard,
Warrington, Cheshire,
WA3 7WD
Tel: 01925 840000
Fax: 01925 852260
www.environment-agency.gov.uk

Health & Safety Executive (HSE)

Grove House
Skerton Road
Manchester
M16 0RB
Tel: 0161 952 8200
Fax: 0161 952 8222
www.hse.gov.uk

Laboratory of the Government Chemist

Queens Road
Teddington,
TW11 OLY
Tel: 020 8943 7000
Fax: 020 8943 2767

www.lgc.co.uk

Land Condition Specialists

www.silc.org.uk

Manchester Area pollution Advisory Committee

www.mapac.org.uk

The National House Building Local Authority

Buildmark House, Chiltern Avenue
Amersham, Bucks
HP6 5AP
Tel: 01494 735363
www.nhbc.org.uk

The Office of the Deputy Prime Minister (ODPM)

Dover House
Whitehall, London
SW1A 2AU
Tel: 020 7944 6589
Fax: 0207 944 6589
www.odpm.gov.uk

Royal Town Planning Institute

41 Botolph Lane, London
EC3R 8DL
Tel: 020 7929 9494
Fax: 020 7929 9490
www.rtpi.org.uk

WRc Plc

Frankland Road, Blagrove
Swindon, Wiltshire
SN5 8YF
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